

STATE OF TEXAS PUBLIC SCHOOL TECHNOLOGY INVENTORY

*A Report on the Current State of Technology Resources
in K-12 Texas Public Schools*

November, 2007

Prepared for
The Honorable Mark Strama
State Representative, District 50

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State of Texas
House of Representatives



MARK STRAMA
DISTRICT 50

November, 2007

Dear Fellow Texans:

I am always struck when I visit public school classrooms in my district that they look the same today as they did when I attended Texas public schools 20 years ago. While technology has revolutionized nearly every other part of our society, the technology revolution has not yet reached our public schools. If we want to cultivate a 21st century workforce and enable our students to compete in a rapidly changing global economy, we must do a better job in this area.

Better integration of technology in the classroom has been a goal of mine since before I ran for my seat in the Texas House of Representatives. Since my election to the Texas House, I have spent considerable time studying and asking questions about this issue, and I have found no one who has the answers to many of my questions. That is why I formed a team to survey and study what schools have in terms of technology.

I believe it is time for the state to move forward and develop a comprehensive plan on how to integrate technology into the classroom in the most effective and cost efficient way possible. I believe the best way to accomplish this is to create an online depository that students, teachers, and parents could access the best pedagogical practices in order to improve student learning. Based on the results of this report, I believe an online depository needs further study. To that end, I support a research study be undertaken during the interim to further study the integration of technology in the classroom and the development of a comprehensive depository of online information.

There are four essential components of educational technology: software/content, hardware, networking infrastructure, and professional development for teachers. Given the limited resources of the state, I believe the software/content component is the "thin edge of the wedge" where the state should focus its resources. This will hopefully inspire school districts to follow suit by investing in the other three critical components.

I advocate for the integration of technology into the classroom to help students learn—and to help teachers teach—reading, writing, and arithmetic. I hope you will find this research study useful

Sincerely,

A handwritten signature in black ink that reads "Mark Strama".

Mark Strama

Credits

EducateAustin.org

EducateAustin.org was established in 2003 to conduct and communicate state wide and local research on technology's integration into Texas K-12 public school classrooms. Locally, EducateAustin.org seeks to build a community of practice centered on award-winning teachers' applications of technology in the classroom.

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Thank You

Thanks to all the principals for their participation in this study and especially for their leadership in Texas education. In addition, thanks to the development team for their efforts and the consulting experts for their wisdom.

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Executive Summary

“The arguments for technology are well known. It is paramount for our future that our students today can face the challenges of tomorrow. We need a government that has enough common sense to recognize this simple truth and fund our future.”

- Comment made by a Texas public school principal

Introduction

Technology has been an engine of change in nearly every sector of society. From the business world to the arts to interpersonal relationships, information technologies, including computers, the Internet, and wireless communications, have revolutionized almost every part of our lives. Organizations from businesses to churches use presentation software to convey information quickly and memorably. The military uses artificial intelligence to train soldiers in disciplines from engineering to language translation. Such innovative tools could be tremendously beneficial in Texas classrooms. However, Texas public schools lack the computer hardware, software, professional development, information technology (IT) support, and financial resources they need to fully realize the benefits that emerging technologies can deliver.

This study is intended to provide policy makers with an overview of the current state of technology resources in Texas public schools. Such an overview is crucial to developing realistic goals for the integration of technology in the classroom, as well as to creating effective legislation that will ensure every Texas student access to those resources. Principals were chosen as primary study participants because as the leaders of school campuses, they are well-suited to provide insight into the ways that the use of technology would improve their schools. Ninety-one percent of respondents were principals; the remaining 8 percent was split evenly between IT specialists and other school administrators. We found the respondent pool to be reasonably representative of Texas public schools in terms of both geographic and grade level distribution. A total of 1,008 public educators across Texas completed the survey in late 2006.

The study found that **principals all over the state express four key needs:**

- **Need for a Central Repository of High-Quality Technology Resources:** Teachers do not have time to search for or evaluate educational materials. They need a complete and reliable source of high-quality lesson plans, activities, and best practices that have been systematically evaluated and will help prepare students for the TAKS test or end-of-course exams.
- **Need for On-Campus Technology Specialists:** Each campus needs an on-site technology specialist to help teachers integrate technology into their lesson plans, fix hardware and software problems when they arise, and manage continuing technology integration.
- **Need for Laptops, Not Desktops:** Mobile laptop carts are a more efficient way of integrating technology into classrooms. Laptops are more flexible and provide a more efficient method of distributing and sharing computers among students.
- **Need for Online Grade and Assignment Portals:** Each school needs to have assignments and grades available online in a secure format so that parents can stay informed and be more active partners in their children’s education.

Key Findings

How Technology is Funded in Texas Public Schools

- **TEA Technology Allotment** – The Texas Education Agency (TEA) provides all school districts with funding, which districts must use in accordance with the TEA Long-Range Plan for Technology. This allotment is the most prevalent source of technology funding.
- **Local fundraising** – This includes gifts, grants, local taxes, and fundraising by local PTAs/PTOs. *Local fundraising is the second most prevalent source of technology funding.*

Principals' Top Priorities for New Hardware

- **40% said their top priority was more computers.** About half of those specified laptops.
- **Roughly one-fifth (19.6%) listed digital projectors** that can be used with presentation software (e.g., PowerPoint).
- **One in six named interactive whiteboards,** which are regular whiteboards connected to computers which digitize the content, allowing students and teachers to print out what they have written.

Teachers and Technology

- Many teachers are reluctant to integrate technological tools into their instruction. *The two main reasons for teacher's reluctance to use new technology are lack of knowledge of how to use equipment and lack of time to prepare or practice.*
- Teachers receive, on average, only 1-2 hours per semester of technology integration training per semester.
- Principals name the integration of technology into Texas Essential Knowledge and Skills (TEKS)-based curricula as their top professional development priority.

Other notable findings

- **Wired v. wireless** – Only 25% of schools use wireless networks. The vast majority use wired infrastructure; that is, each computer's Internet connection comes through an Ethernet cable plugged into a wall.
- **Content filtering** – About three-quarters (72.3%) of schools restrict students' access to questionable material by filtering data through keyword searches. 7% do not allow students to browse the web at all. 14% only allow students to access data on the school's intranet.
- **Satisfaction with IT support** – Most principals rate district IT support as good.
- **Laptop Textbooks** – Many principals expressed a desire to replace textbooks with laptops loaded with educational software and content.

Conclusion

In our highly technological society, the state should ensure that children everywhere in Texas have reasonable and effective access to the technology that will prepare them for post-secondary education or productive employment; however, the current state of technology in Texas schools is not encouraging. There is a wide disparity in terms of what technology resources are available throughout the state. Most schools struggle to fund technology and seek external sources. While some well-to-do districts have students using technology on a daily basis, others districts have neither the technology nor the teacher training to provide students with basic computer literacy skills leaving these students unprepared for life in the 21st century and at an instant disadvantage. The state should therefore increase funding opportunities for schools that need assistance in acquiring appropriate hardware, software, and infrastructure, including mobile laptop carts and wireless networks.

The state of Texas should provide a centralized repository of high-quality, well-evaluated digital resources that leverage technology to its best advantage. These resources should include lesson plans categorized according to specific state assessment standards allowing for teachers to quickly search and find relevant digital resources to be used in class. The resources might include movie clips, animations, simulations, software, online activities, presentation slides, or anything found to be particularly effective in teaching to the specific standard. This online repository should have professional development built into it by means of short video clips showing teachers actually using the technology in the classroom. An outline with detailed instructions should be provided for each lesson along with assessment measures so that teachers can evaluate learning gains from using the technology in class. Finally, this online repository should have some form of communication system, such as a wiki or blog, so that teachers from around the state can post their experiences and ideas about specific instructional technologies for specific state assessment standards in one centralized place.

Texas must provide each campus with readily available IT support, including quality professional development so that teachers will reach a level of comfort and competency with technology which should allow them to use these new tools to maximum effect. An on-campus Technology Specialist is regarded as a solution to this because IT problems occur randomly on a day to day basis. The use of technology in schools is only going to increase thus proper accommodations need to be made to meet this reality. Further, teachers need help integrating technology into their curriculum on a daily basis. A once a semester training session for one hour can effectively only cover how to use one piece of technology such as educational software or hardware. Teachers simply do not have the time nor the support to effectively integrate technology into their daily lesson plans.

It is well documented that parental involvement can have a large positive effect on children's education. The state should ensure that each campus maintains a secure online grade and assignment portal that will allow parents to stay abreast of their children's progress. Such portals could also provide message boards for increased communication between teachers and other parents, chat interfaces to allow for easier parent-teacher conferencing, and supplemental instructional resources so that parents can get more involved in their children's schoolwork.

The time to act is now. As Texas school administrators repeatedly reported, we know that effective use of technology makes schools better, and investing in those technologies is nothing less than funding our future.

Information technologies, including computers, the Internet, and wireless communications, have become an integral part of our world. Children born after 1990 literally do not remember a world without the Internet. Texas needs to prepare all students for entry into higher education or the workforce, both of which require basic computer literacy and technological competence. Further, younger generations who grew up with these technologies and use them for everything from shopping to communicating with friends across the globe are more engaged by lessons that utilize them.

Currently there is very little information available describing the quality or quantity of technological resources available in our public schools. In order to understand where we are and to plan responsibly for the future, we must know what kinds of technological resources currently exist in Texas public school classrooms, how educators use those tools, and what resources they need to improve technology integration into the classroom.

The Texas Public School Technology Inventory was developed to answer many of these questions. It measured the following six areas of technology integration: 1) computer hardware; 2) software; 3) Internet access, 4) professional development, 5) information technology (IT) support, and 6) technology integration in the classroom. Principals were chosen as the primary study participants because as the leaders of school campuses, they are well-suited to provide insight into the ways that the use of technology would improve classroom instruction at their schools as well as what systems might be put in place at the campus, district, or statewide levels. The survey was sent via email to approximately 6,000 of the 7,600 public school principals in Texas. Ninety-one percent of respondents were principals; the remaining 8 percent was split evenly between IT specialists and other school administrators. A total of 1,008 respondents across Texas completed the survey in late 2006, for an overall response rate of 17 percent.

The results were found to be representative of Texas schools in terms of geographic location and grade level. That is, the responses were consistent in terms of statewide grade level distribution as well as in the distribution of schools across Educational Service Center (ESC) regions. The survey's representation of Texas schools is graphically illustrated in Chapter 2 and discussed in-depth in Chapter 16. In addition, the findings of the survey were consistent with STaR Chart data (Chapter 15) collected by the Texas Education Agency (TEA). Thus, we consider the results to be reasonably reflective of the population of Texas schools, providing an accurate overview of the technology resources available on Texas public school campuses.

We must, however, acknowledge possibilities for error or bias in the results. A convenience sample was used; therefore, the sample is not particularly random. In addition, because the survey was distributed via email, which requires relatively up-to-date computers and an Internet connection, the survey could have missed the poorest and most technology resource-starved schools in Texas. These and other issues are further discussed in Chapter 17.

This report strives to provide a voice for Texas school principals and to illustrate a sense of the overall picture of technology resources in schools. To accurately portray the nuances of survey responses,

charts showing the distribution of all responses to questions are presented along with direct quotations taken from individual responses to open-ended questions.

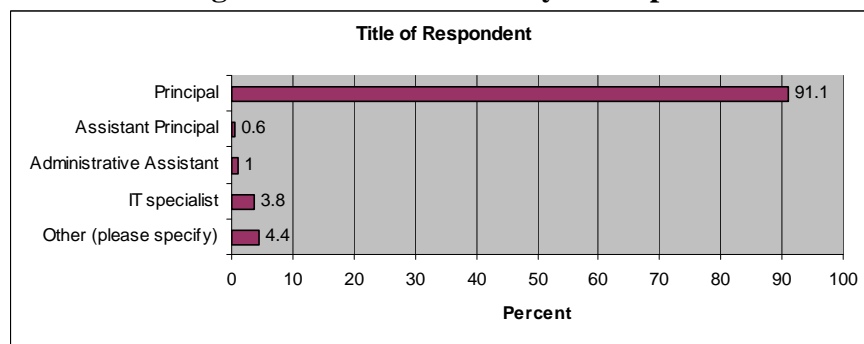
Who Was Sampled

In this Chapter:

- A sample of predominantly principals
- Number of students on campuses surveyed
- Percentage of students qualified for free or reduced lunch
- Potential sources of error

Of the 1,008 responses to the survey, 91% were made by principals. IT specialists accounted for 4%. Directors of instructional technology, associate principals, and superintendents accounted for another 4%. Because the vast majority of respondents (91.6%) were principals or assistant principals, the terms “respondents” and “principals” are used interchangeably in this report.

Figure 2.1 – Predominantly Principals



While the sample included small, medium, and large campuses, the average number of students on surveyed campuses was in the 401-600 range. The distribution of the number of students on free or reduced lunch was relatively flat – that is, fairly evenly distributed - but the most frequent answer was 51-70% of students.

Figure 2.2 – Number of Students on Campus

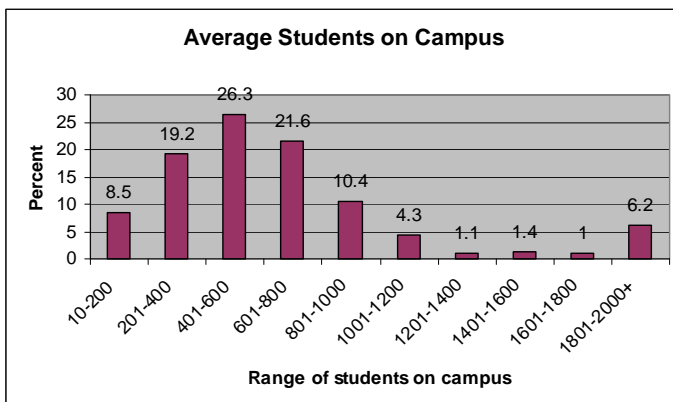
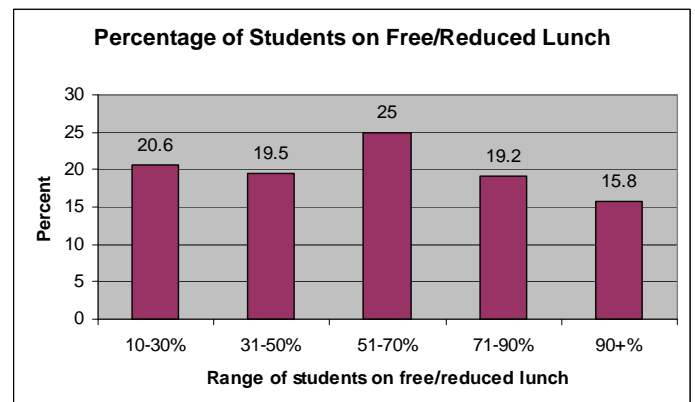


Figure 2.3 – Free or Reduced Lunch



Because the survey was distributed via email, responding to the survey required basic technology resources that some schools still may lack. Economically disadvantaged schools may be underrepresented in this sample. Additionally, finding emails for principals was challenging; many school websites utilize generic contact forms, and many school websites do not include contact information for individual administrators. Finally, though approximately 6,000 principals were emailed, there are a total of roughly 7,600 public school principals in Texas. Thus, 1,600 principals, or approximately 21% of all Texas public school principals, did not receive this survey. These and other potential causes for bias are discussed in Chapter 17.

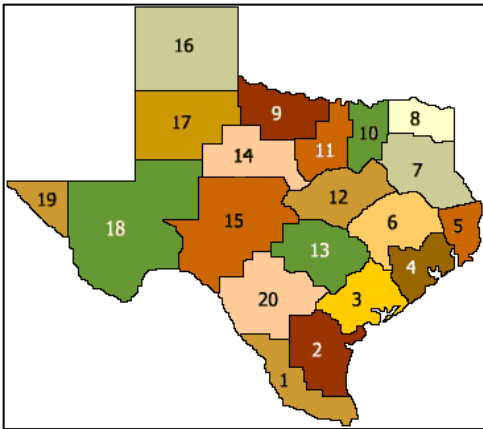
In this chapter:

- Geographic Representation by ESC
- Grade Level Representation Overall

To establish that this survey is representative of Texas public schools, two procedures were carried out. We looked for any major differences between what schools responded to the survey, how many schools there are in Texas, and where those schools are located.

Geographic Representation by ESC

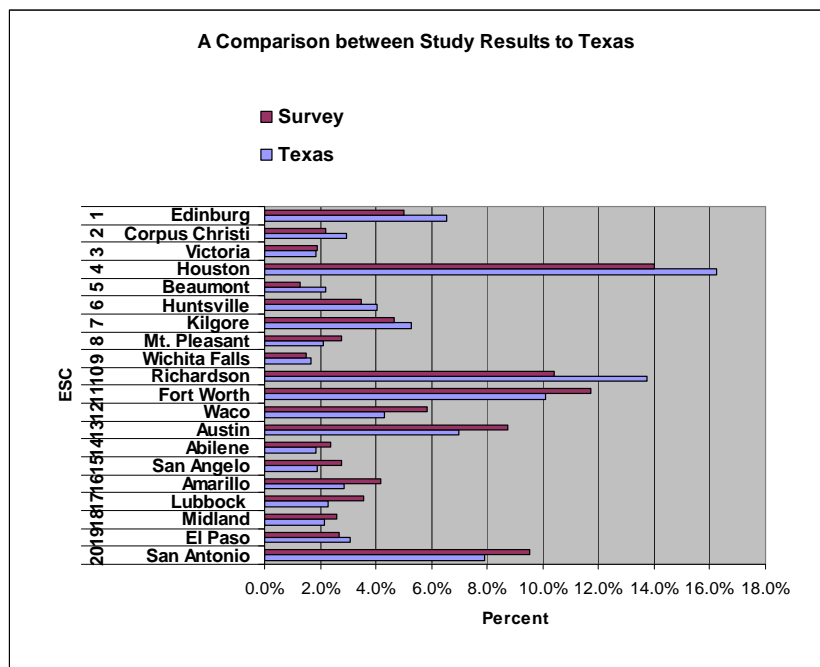
Figure 3.1 – Map of ESC Regions



The first procedure compared the survey’s response rate from each Educational Service Center (ESC) to the percentage of schools in Texas that each ESC represents (Figure 3.2). To accomplish this, we first categorized the results by ESC. A total of twenty ESCs provide educational support and services for districts located within their particular geographic regions (Figure 3.1). We determined the percentage of Texas schools supported by each ESC. Then we compared the percentage of Texas schools in each ESC to the response rate for each ESC. The response rate is the number of survey responses for an ESC divided by the total number of schools in that ESC.

Figure 3.2 – Comparison of Survey Response Rate to Percentage of Texas Schools by ESC representation

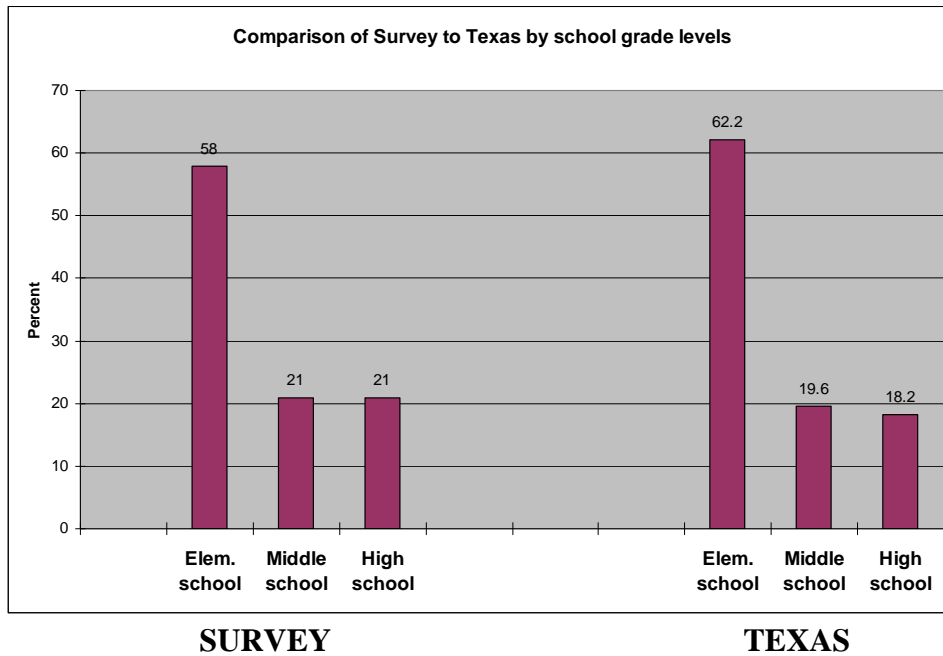
While there are some differences between the response rate for some regions and the actual percentage of Texas schools that the ESCs represent, these differences are not statistically significant and never exceed 2.5%. Thus, the survey’s representation of schools in each ESC is generally representative of the actual populations of schools in each ESC.



2. Grade Level Representation Overall

The second procedure compared the grade level distribution of surveyed schools to overall grade level distribution in Texas (Figure 3.3). We found the sample's grade level distribution to be consistent with Texas schools – that the percentage of elementary, middle, and high schools in the surveyed sample is consistent with the percentage of elementary, middle, and high schools in Texas (Appendix C). This indicates that the survey is generally representative in terms of grade level.

Figure 3.3 – Comparison of Survey Responses to Texas by Grade Level



These two procedures compared the actual population of Texas schools to a sample of over 1,000 Texas schools. The results of the two procedures showed the geographic and grade level distribution of the sample to be consistent with the actual geographic and grade level distribution for schools across all of Texas. Therefore, the results of this survey can be reasonably generalized as being an accurate picture of the current state of technology resources in public schools across Texas.

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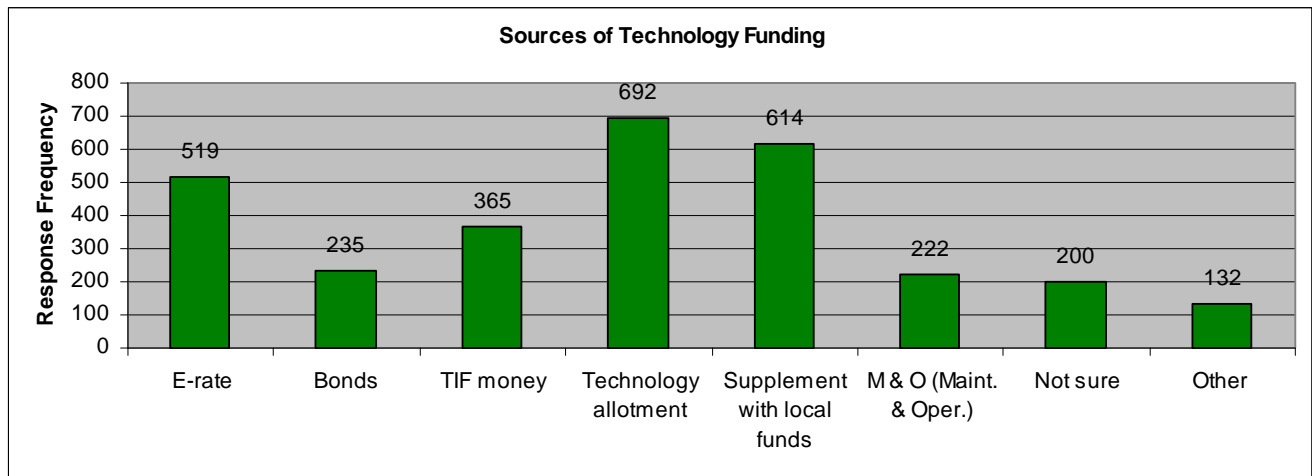
Technology Funding

“The state wants to go to online testing and there is no way my campus will be ready within five years unless the central administration is willing to spend funds out of general fund balance since we do not receive the appropriate funds from the state.”

- Comment from a Texas public school principal

Principals fund technology expenditures in their schools through a variety of sources. Figure 4.1 shows the frequency with which principals reported each. Descriptions of each source are found in Appendix B. By far the most frequently chosen source of technology funding reported by respondents was the Texas Education Agency (TEA) Technology Allotment. TEA provides all school districts with certain funds earmarked for the purchase of technology. Each district must use the funds in accordance with TEA’s Long-Range Plan for Technology.

Figure 4.1 – Sources of Technology Funding



The second most prevalent funding source is local funding. This category includes gifts, grants, and local taxes, as well as funds raised by local Parent-Teacher Associations or Parent-Teacher Organizations.

The third most frequent choice was TEA’s Schools and Libraries Universal Service Support Mechanism, commonly known as E-rate. E-Rate provides schools and libraries with affordable access to advanced telecommunications services. The program provides discounts ranging from 20% to 90% on Telecom Services, Internet Access, Internal Connections, and Basic Maintenance of Internal Connections to eligible schools and libraries. There is a \$2.25 billion annual cap.

Respondents’ most common “Other” response was Title I funds. Title I funds are federal monies set aside to improve academic achievement among economically disadvantaged students

Figure 4.2 – Principals’ “Other” sources of funding responses

Responses	Frequency of Response
Title I	36
Grants	21
PTO/PTAs	15
Federal funds	9
Local gifts, grants, and/or taxes	9
TIP grants	3
TIF money	2

Principals’ Comments on Funding

“When you look at the goal of having a projector, 5 computers (including 1 teacher multimedia computer), printer, etc. the minimum cost to outfit one classroom with the appropriate technology reaches over 7,000-8,000 dollars... As a middle class school district, E-rate helps some with infrastructure but not enough for our students to have the same opportunities as surrounding area schools that have more at-risk students. Our budget for IT equipment is simply not large enough to meet the current curriculum needs of our students.”

“I need more funding. I am not a campus that receives Title funds, so my budgeted resources are very limited. Most of the computers I have are because my parent organization bought them.”

“We are a TIP Immersion Grant School, when the grant stops in two years our District cannot afford to keep in place the software programs we currently use and is provided by the grant. Upgrade our laptops that will be five years old. Purchase new equipment and new programs for use in the classroom.”

“It is very frustrating at the campus level to be required to field test on-line Reading Proficiency Tests in English (RPTE) without adequate technology funding from the state!!!”

“Right now funding is sporadic and since all technology funding has been cut, the equipment has aged and cannot be replaced with multimedia equipment that runs videostreaming, etc.”

Top Technology Priorities of Principals

“We are in desperate need of computers for the classrooms. We have not been able to keep up with the demand due to restricted technology funds.”

- Comment from a Texas public school principal

Respondents were asked to list their top priorities in terms of technology for their campus. The most frequent response was more computers. They would prefer laptops that could be used in classrooms rather than more computer labs. Time in computer labs is extremely limited and in high demand, and teachers must compete for a particular day and class time. Thus, mobile carts containing sets of laptops emerged as a top priority of principals. Digital projectors were the second highest technology priority for principals. Presentation software (such as PowerPoint or Keynote) appears to be infrequently used in the classroom. Approximately half of respondents reported that less than 25% of their teachers use presentation software in class at least once a week. Digital projectors would enable them to increase that number. The third highest technology priority was interactive whiteboards, which are regular whiteboards connected to computers which digitize the content, allowing students and teachers to preserve their work by saving or printing out what they have written.

Figure 5.1 – Top Priorities of Principals

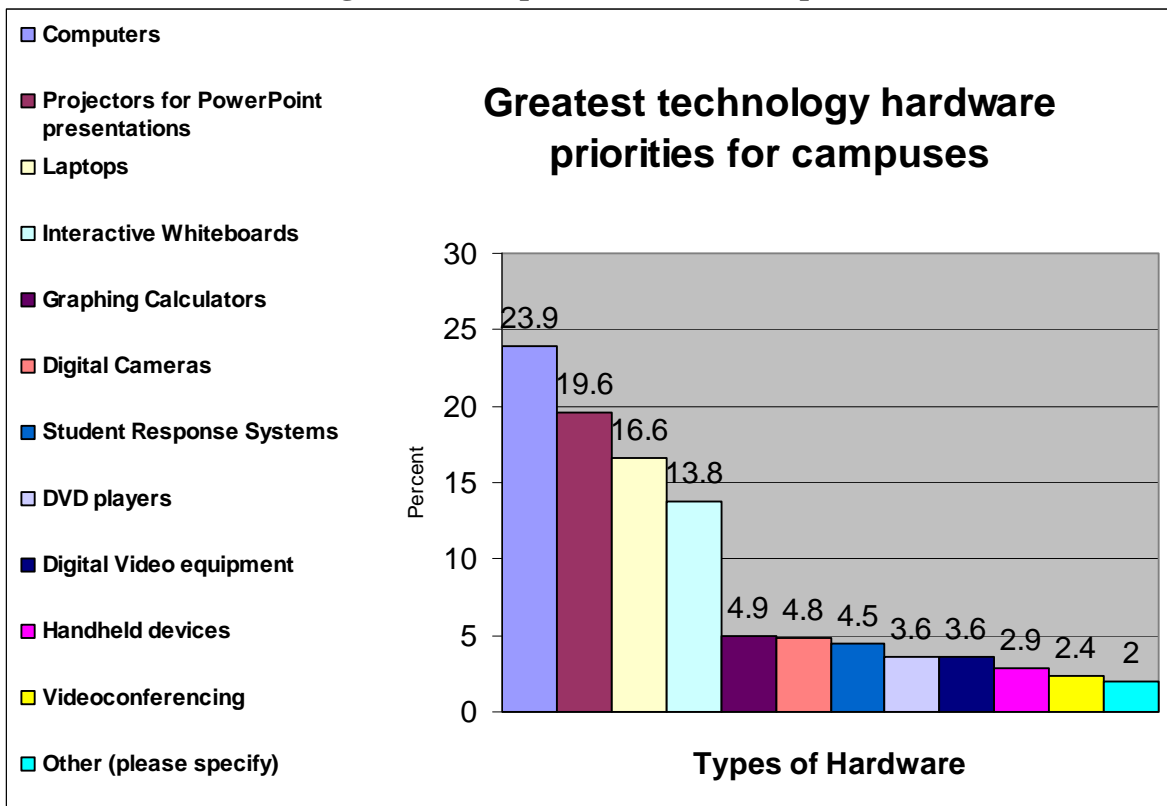


Figure 5.2 – Principals’ "Other" responses to technology hardware priorities

Response	Frequency of Response
Document Viewers/Camera	18
ELMOs (document cameras that produce digital images of paper documents and present them via a digital projector on a screen)	10
Wireless connection	3
Improving infrastructure of building	3
Printers	3
Mobile computer lab	3
Internet access	3

Principals’ Comments on Top Technology Priorities

“Students need individual laptop computers instead of books.”

“We currently have a computer to student ratio of 1:9.”

“We currently need computers in the classroom so that students can access them, instead of needing to send students to the lab. If computers were in the classroom, teachers would make better use of them.”

“Need more laptops on carts so teachers can use them in class more regularly then depending on a lab being available.”

“We do not have enough computers for students in the classroom that are up to date. Many programs require operating systems that we do not have. Internet access is very slow which discourages teachers from using the computer lab. Need faster, up to date computers for teachers and students to be able to do research and use new software programs.”

“We, currently, need more computer lab space. Currently, we have three labs. These labs are used daily. Our demand is outpacing our supply.”

“We need online grades available to parents, we need smartboards, we need more projectors and more interactive software in our math classes.”

“We need projectors and elmos.”

Classroom Presentation Media

“Technology allows the integration of many visuals in a lesson in a snap. It is most effective when teachers have a mounted white board and mounted projector, with the ability to project Internet, powerpoint presentations, video streaming, television and print/objects using an Elmo. Interactive tools, such as the Interwrite pads, allow students to interact with the projected materials.”

- Comment from a Texas public school principal

In this chapter:

- TVs & Media in the Classroom
- Videoconferencing

TVs & Media in the Classroom

Over 90% of principals reported having DVD and VHS players in their classrooms. Just over 50% reported having cable TVs, and approximately 26% of campuses have adopted Video-On-Demand. In terms of presentation systems, over 90% of campuses reported having digital projectors as well as overhead projectors. One-third of schools reported having interactive whiteboards in the classroom.

Figure 6.1 – Broadcast Media in the Classroom

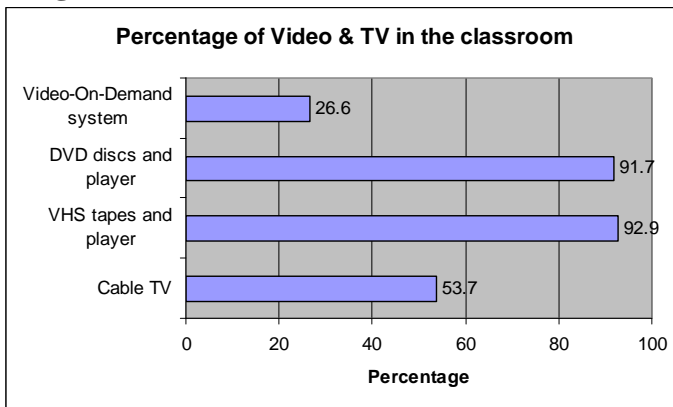
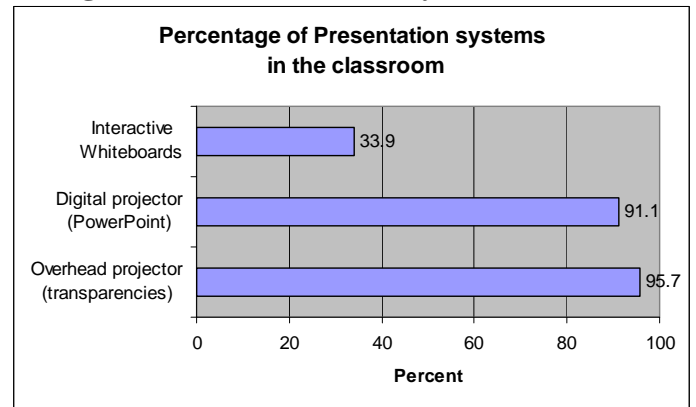


Figure 6.2 – Presentation Systems



Principals' Comments on Presentation Media

“Integration of technology into instruction is much more engaging for students. They are also more motivated to learn. Interactive white boards, projectors, and document cameras provide an excellent resource for this type of instruction.”

“Interactive whiteboards would help teachers easily provide visuals for students.”

Videoconferencing

Only 30% of principals reported having videoconferencing capabilities (defined as the ability for off-campus teachers to teach on-campus students via video). Videoconferencing shows particular promise for rural schools, which often lack the variety of trained personnel necessary to offer all desired classes, but most schools also lack the technology infrastructure necessary to provide such opportunities.

“You can extend the learning so much more by being able to look information up right then and there on what you are studying. Plus the information is current. I believe that textbooks should be on laptops for the students and teachers. Children would be able to delve so much further into a subject than a textbook will allow.”

- Comment from a Texas public school principal

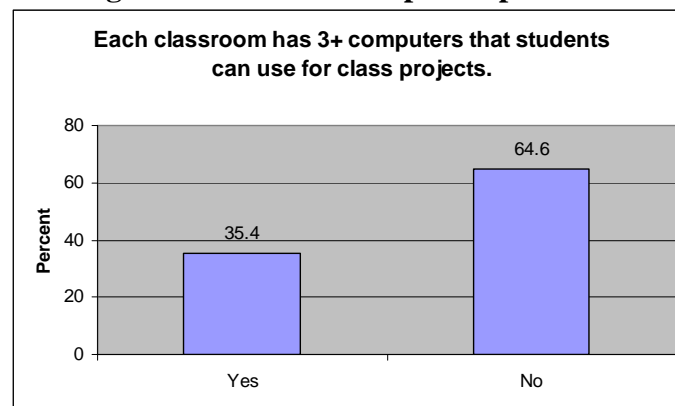
In this chapter:

- Computers in the Classroom
- Laptops
- Computer Labs
- Computer Carts

Computers in the Classroom

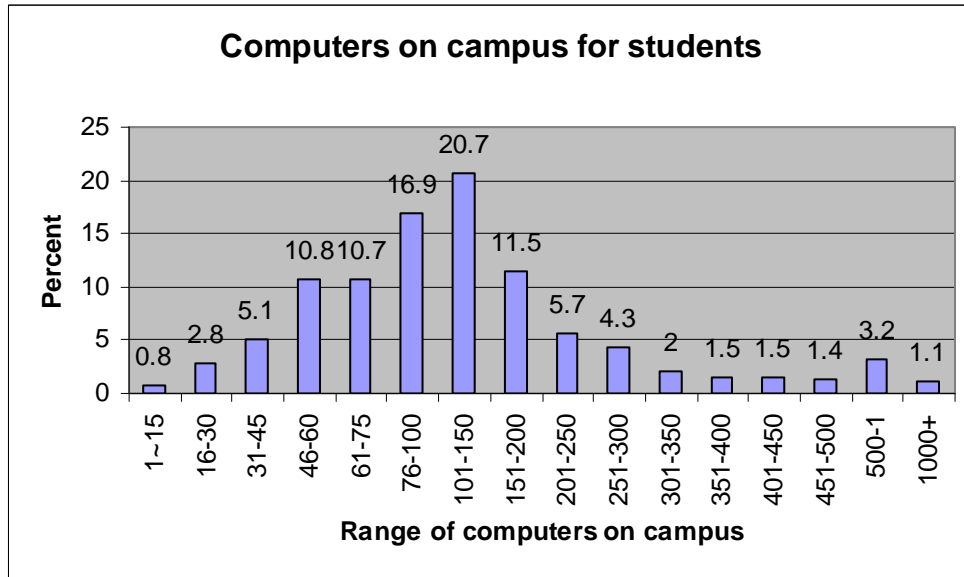
Ninety-six percent of teachers reported having their own computers to keep grades. Only one-third of schools reported having three or more computers in the classroom available for student use.

Figure 7.1 – Three Computers per Class



The average range of computers on campuses was from 101-150 computers. Less than 4% of campuses have fewer than 30, and less than 5% have more than 500.

Figure 7.2 – Average Number of Computers on Campus



Forty-five percent of respondents said their schools’ computers were under three years old, but more than 50% report that the computers used by students were four or more years old. The majority of them (86%) are PCs, with just under 12% Apple products and the rest other.

Figure 7.3 – Average Computers in Classroom

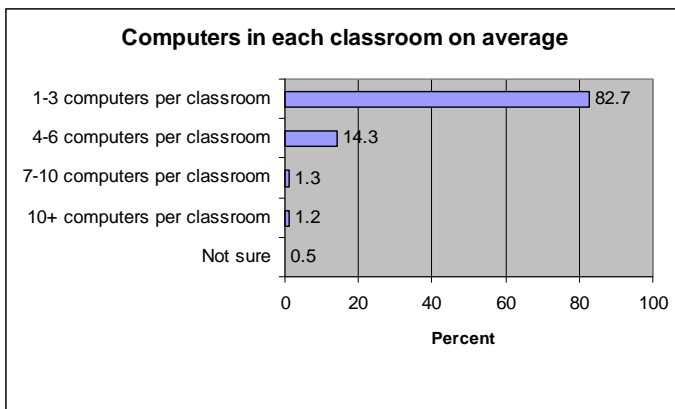
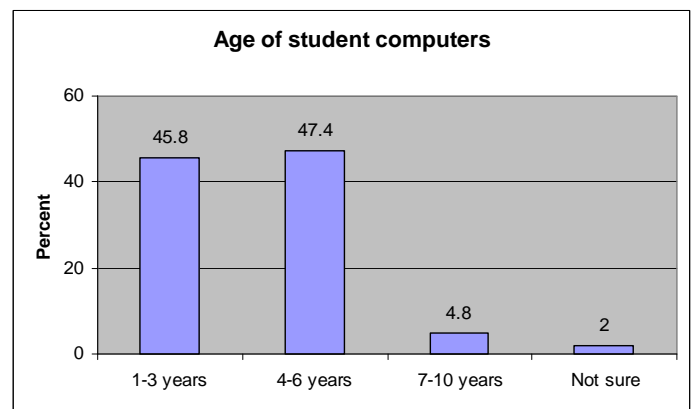


Figure 7.4 – Age of Computers



Principals’ Comments on Computers

“It would greatly increase the student learning on my campus if each student had a laptop they could use throughout the school day so they could work at their rate and level.”

“Having 3-5 computers in the classroom for use by students would be great.”

“If computers were in the classroom, teachers would make better use of them.”

Laptops

Less than 20% of campuses are providing laptops to their students. However, laptops for students are the most sought-after technology according to our respondents. Even on campuses that do provide some laptops to students, less than 25% of students actually receive laptops for personal use.

Figure 7.5 – Laptops to Students

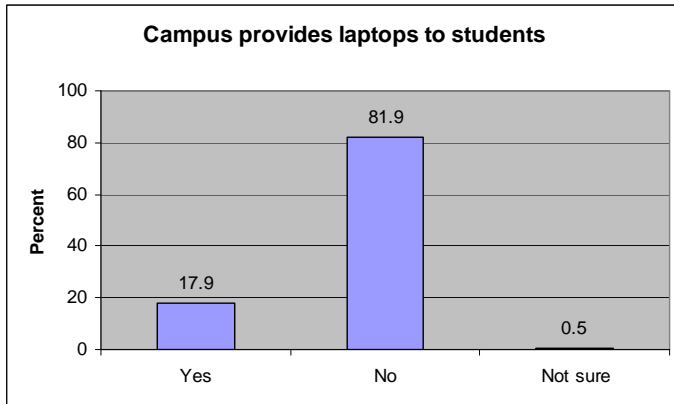
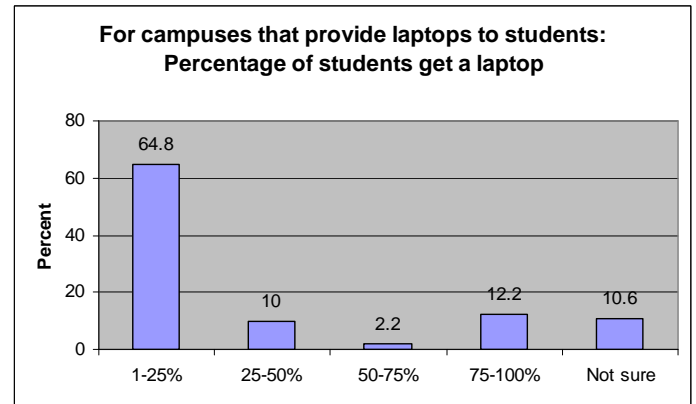


Figure 7.6 – Percentage that get Laptops



Even those schools that do provide laptops do not appear to be gaining maximum benefit from the flexibility they offer. The overwhelming majority of students who do receive laptops (93.4%) are not ever allowed to take them home; just 2.3% are sometimes allowed to take them home. And nearly two-thirds of respondents said that the laptops lack a wireless Internet connection. Only one-third of respondents said their campuses provide wireless connections for students to use with laptops.

Figure 7.7 – Take Laptops Home

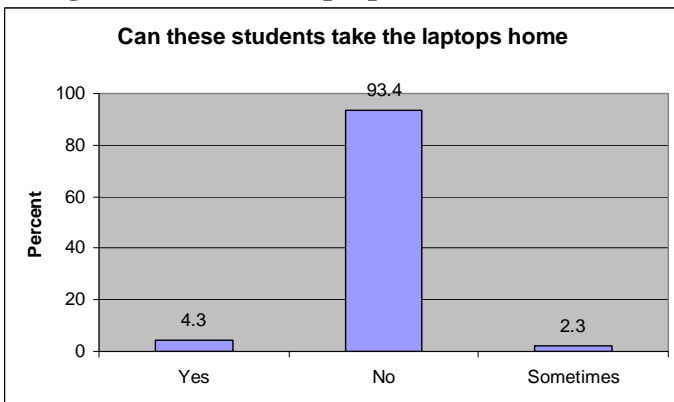
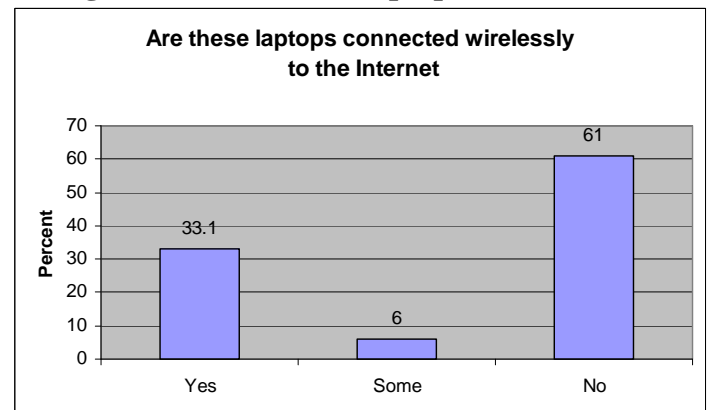


Figure 7.8 – Wireless Laptops



Principals' Comments on Laptops as Textbooks

“I think we should get rid of textbooks and have all students use wireless laptops . . .”

“A move to laptops and wireless connections for instruction and instructional materials, including textbooks, should be the focus. Textbooks could be downloaded and easily updated.”

“It would greatly benefit our children if every child were provided a laptop loaded with educational software to support the curriculum.”

Computer Labs

For this survey, a computer lab is defined as a room dedicated for students to use computers for instructional activities. Ninety-four percent of campuses reported having at least one computer lab on campus. Forty percent of schools reported having one lab, followed by 34% having two labs, 13% having three labs, 8% having four labs, and 5% having five or more labs. The average number of computers in each lab ranges from 21-30; nearly three-quarters of respondents' schools have approximately that many.

Figure 7.9 – Average Number of Labs

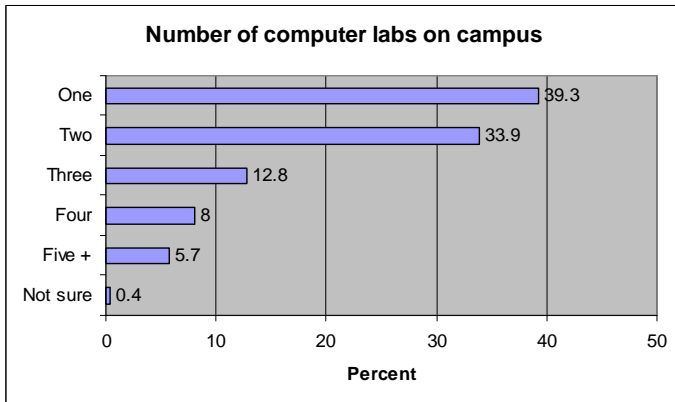
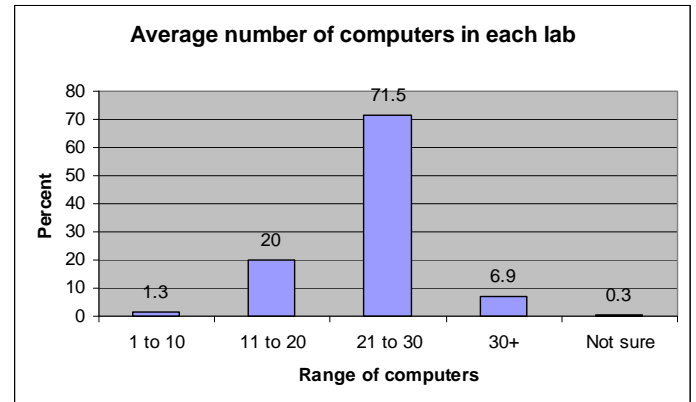
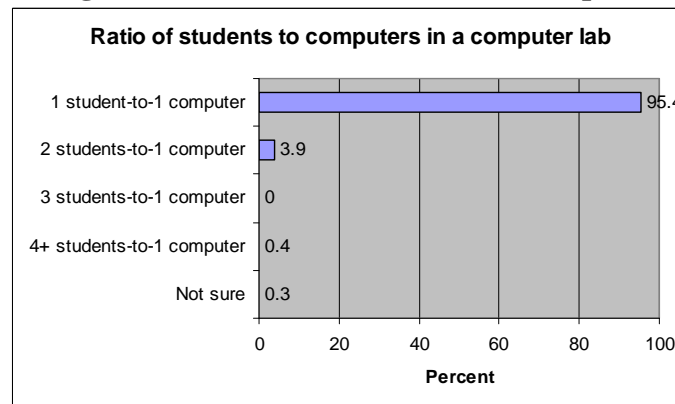


Figure 7.10 – Computers in each Lab



When students do get the chance to work in a computer lab, each typically gets a computer to him- or herself. Less than 4% work with another student, and less than 1% work with more than one other student.

Figure 7.11 – Ratio of Students to Computers



Principals' Comments on Computer Labs

“Elementary campuses with more than 500 students should have two computer labs.”

“Teachers should be able to conduct integration lessons in their classroom and not have to sign up to use a lab.”

Computer Carts

For this survey, a computer cart is defined as a mobile presentation station for teachers which generally includes a computer and projector. Just over half the respondents reported lacking mobile computer carts (mobile presentation stations for teachers). Of the campuses that had computer carts, the nearly three-quarters (73.6%) have between one and three available. Given that the average campus in the survey has 400-800 students with a minimum of forty teachers, the ratio of carts to teacher is such that teachers must compete for a small number of carts.

Figure 7.12 – Mobile Presentation Stations

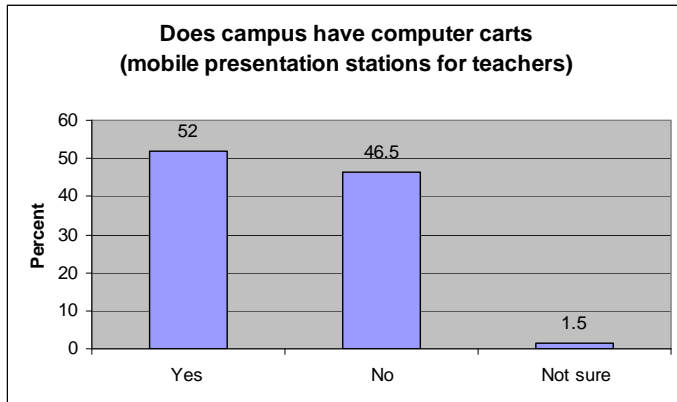
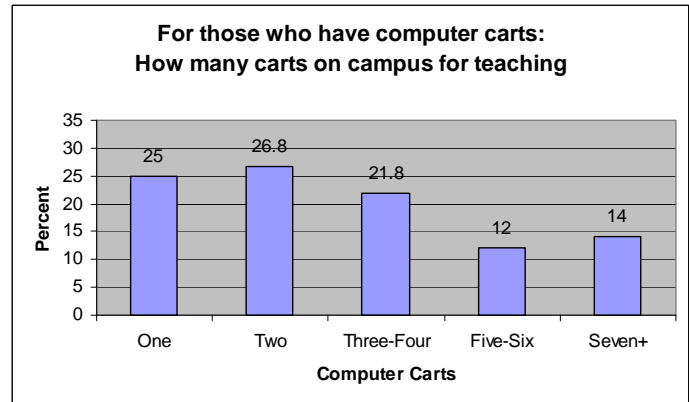
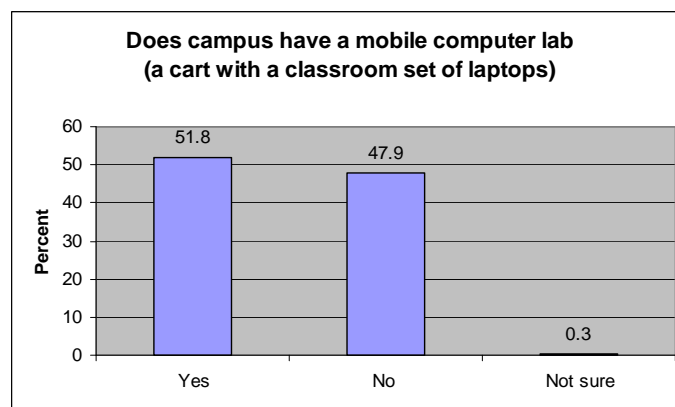


Figure 7.13 – Number of Stations on Campus



Similarly, 50% of respondents reported that their schools lack computer carts (carts with a classroom set of laptops). Principals stated that using mobile laptop carts is a much more efficient method for integrating technology into the classroom versus having students move to a computer lab.

Figure 7.14 – Mobile Computer Labs



Principals' Comments on Mobile Laptop Carts

“Need more laptops on carts so teachers can use them in class more regularly then depending on a lab being available.”

“We would like to have wireless laptop carts that would allow the computers to come into the classrooms as needed instead of going into and sharing one computer lab that is inadequate.”

“I think that education is no longer how much you know but if you know how to find out the information. To do that successfully it is important that students learn how to use technology/world wide web and where to look for the information.”

- Comment from a Texas public school principal

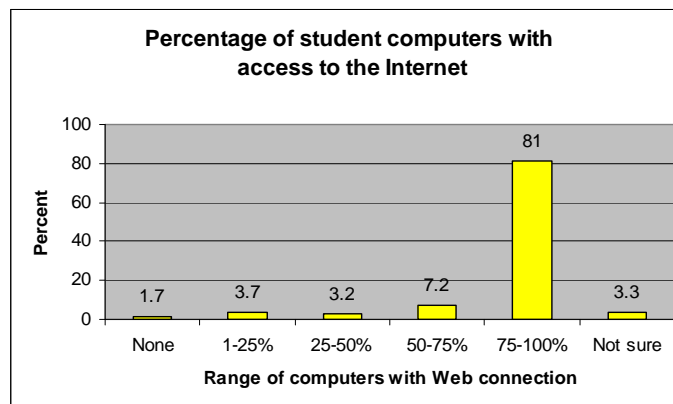
In this chapter:

- Internet access
- Infrastructure
- Classroom Internet access
- Internet filtering

Internet access

About 80% of schools reported having 75-100% of their student computers connected to the Internet. 7.2% have Internet connections for between half and three-quarters of student computers.

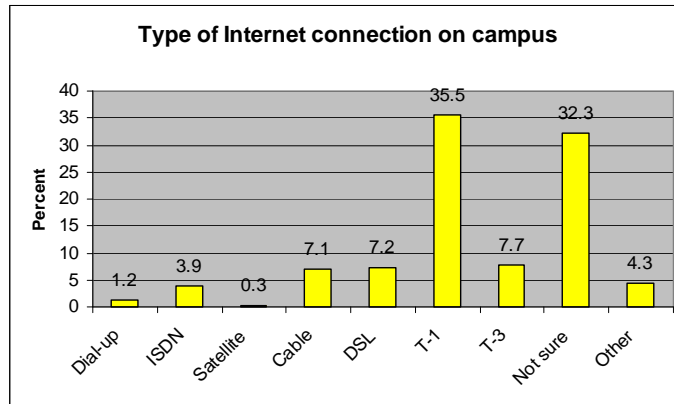
Figure 8.1 – Percentage of Computers Online



Infrastructure

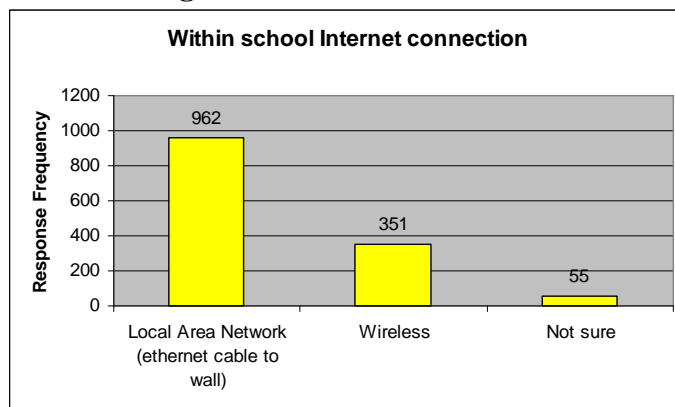
Over 40% of respondents reported that their campuses have either a T-1 or a T-3, what is commonly called a high-speed connection. Nearly a third were not sure what kind of connection they had.

Figure 8.2 – Speed of Connection



More than half of schools use wire-based infrastructure (i.e., computers are connected to wall jacks with Ethernet cables). Just a quarter of schools use a wireless network.

Figure 8.3 – School Network



Classroom Internet Access

80% of campuses reported having at least one computer with an Internet connection for students in each classroom. 18.2% do not, and the remainder of respondents were unsure.

Principal Comments on the Web

“I think online textbooks and laptops for all students would be a huge step in the right direction for TEKS based instruction as well as remediation.”

Internet Filtering

Parents are justifiably concerned about what materials their children are exposed to on the Internet. Content accessible to students is most commonly restricted by the use of keyword searches, with 85.4% of respondents reporting use of this strategy. Allowing students to access solely materials on schools' intranets is the next most popular strategy for content restriction but is only used by about 17% of respondents.

Figure 8.4 – Internet Filtering

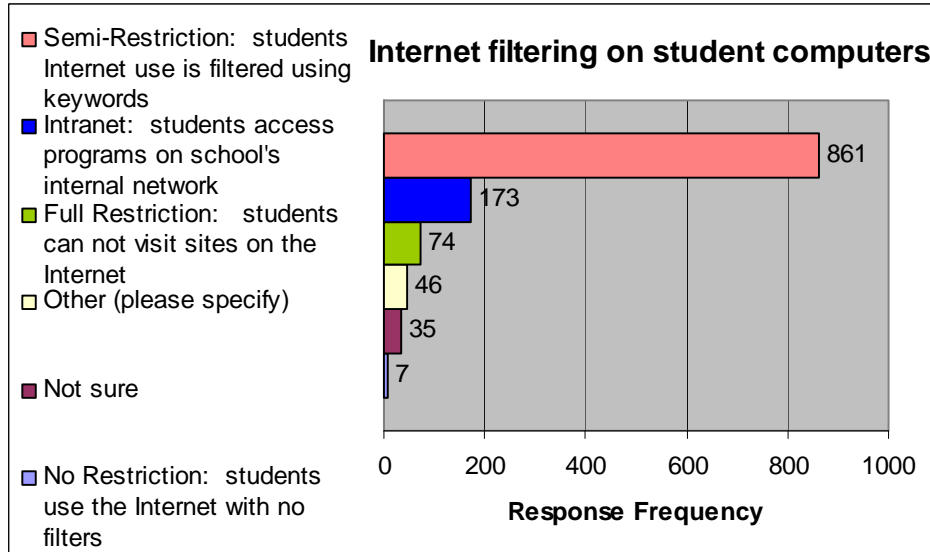
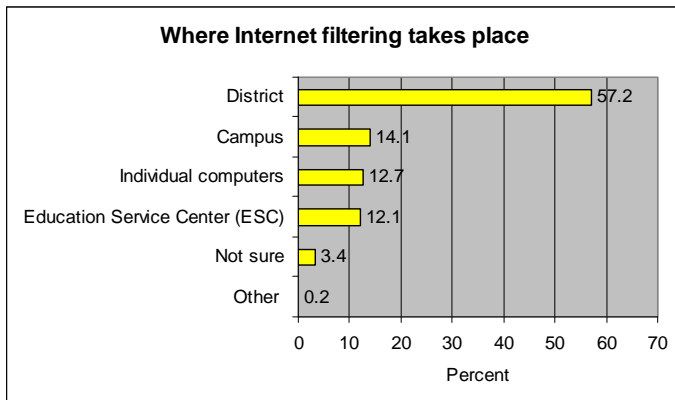


Figure 8.5 – Principals' "Other" Internet Filtering responses:

Response	Frequency of Response
Teacher/Staff supervision	13
District filter	8
Parent permission	5
District policy	4
Local Acceptable Use Policies/Child Internet Safety	1
As per Children's Protection Act	1
Access codes on computers	1
ESC filter	1

Figure 8.6 – Internet Filtering



Almost 60% of respondents report that this filtering occurs at the district level rather than the individual school level. Roughly equal percentages report filtering at the ESC, campus, or individual computer level; these account for nearly all the remaining 40%.

Software/Applications

“It would greatly benefit our children if every child were provided a laptop loaded with educational software to support the curriculum.”

- Comment from a Texas public school principal

In this chapter:

- Sources of educational software/applications
- Web-based activities
- Presentation software in the classroom
- Modern productivity software
- Modern operating system

The most commonly reported source of software for teachers is the school district, with more than a quarter of respondents reporting that source. Teachers also often use software that comes with textbooks (19%) or is purchased from technology companies (17%). One in six respondents report that teachers at their schools use free online applications, and slightly less use pay-to-play online applications. Less than 10% report using other sources.

Figure 9.1 – Sources of Software/Applications

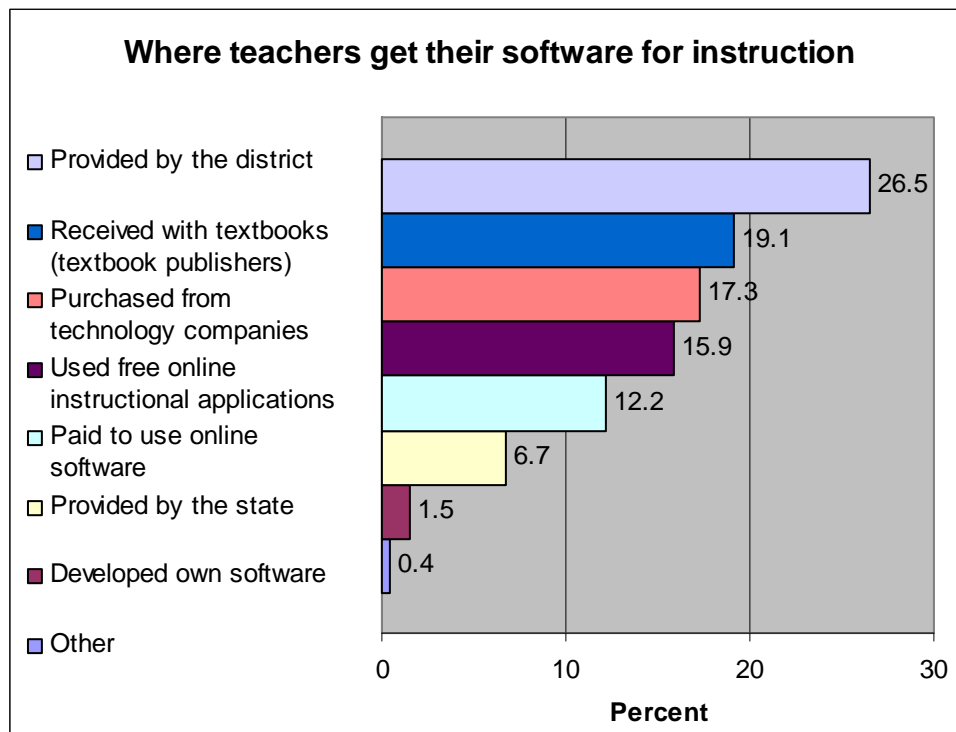
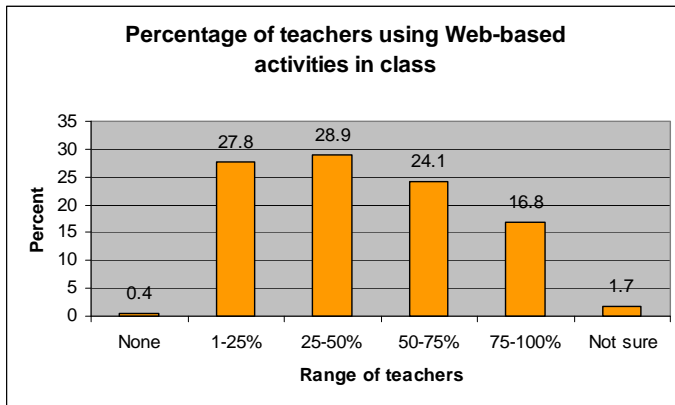


Figure 9.2 – Principals’ "Other" responses to how teachers get instructional software

Response	Frequency of Response
Campus money	8
Teachers buy their own software	2
PTA	2
Campus Title I and At-Risk funds	1

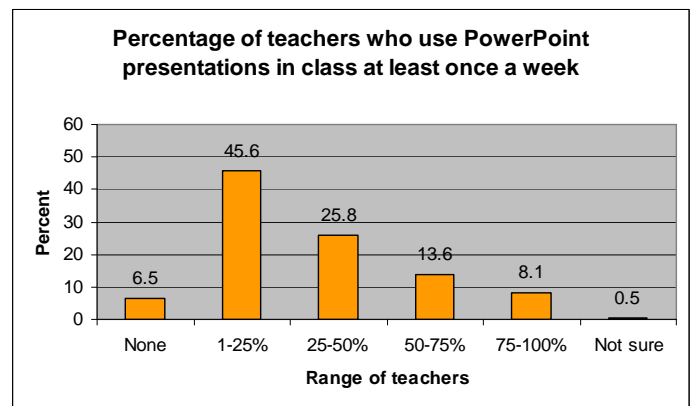
Figure 9.3 – Web-based Activities



There was wide variation among principals’ responses regarding teachers’ use of web-based activities. Nearly equal numbers of respondents said that fewer than 25%, 25-50%, or 50-75% of teachers at their schools use web-based activities in their classroom instruction.

Answers regarding presentation software showed a more distinctive trend. Nearly half of respondents said that 25% or less of the teachers at their schools use presentation software as a teaching tool at least once a week. Just one-fourth said that 25-50% of teachers do so.

Figure 9.4 – Presentation software



Answers about the kinds of software installed were also more consistent. Over 80% of respondents said that student computers have an up-to date operating system like Windows XP or Mac OS X. About three-quarters of respondents said that more than 75% of computers at their school have Microsoft Office or equivalent applications installed.

Figure 9.5 – Modern Productivity Software

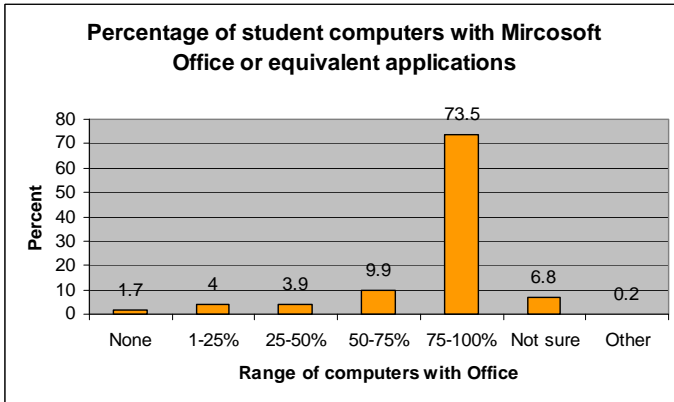
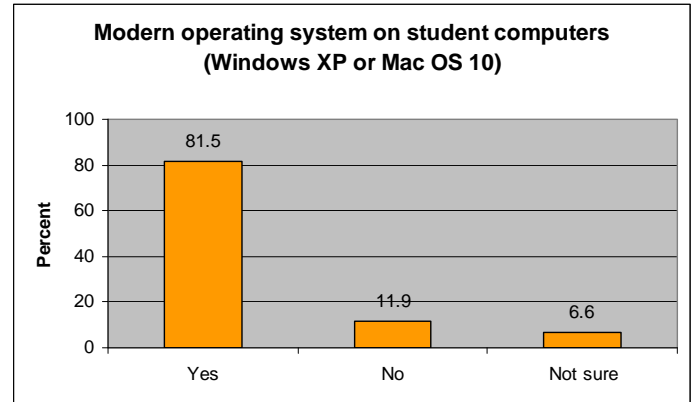


Figure 9.6 – Modern Operating System



Principals’ Comments on Software

“Many programs require operating systems that we do not have.”

“We need to be assured of continuing updates of equipment, software, and operating systems to take advantage of the many excellent resources on-line and provided by our district.”

“Looking for after-school remediation and TAKS prep software to use in a lab setting that is very student-friendly and requires little management from teacher.”

*“Teachers are unsure of how to use technology. It takes lots of time to learn how to use programs and more time to incorporate the usage into the daily classroom lessons. Teachers are taught to teach a certain way and those habits are hard to break. I struggle with this constantly. Summer academies that are required would help. Especially if there were stipends attached to pay teachers above and beyond the yearly salary. Once they could learn newer ways to incorporate technology into the classroom, they would be more apt to continue using it. Teaching methods **MUST** change to assure this trend is used regularly.”*

- Comment from a Texas public school principal

In this chapter:

- Top Priorities for Teacher Technology Professional Development
- Training Sessions
- Teachers as Technology Mentors

Principals overwhelmingly reported that training for successful integration of technology into a TEKS-based curriculum is a top priority; this was chosen nearly twice as often as any other priority. The next most frequent choice, picked by nearly a quarter of respondents, was where to find free TEKS-based activities on the web. Web publishing skills and sources for TEKS-based instructional software were near-equal priorities, each chosen by about 15% of respondents.

Figure 10.1 – Top Priorities for Teacher Professional Development

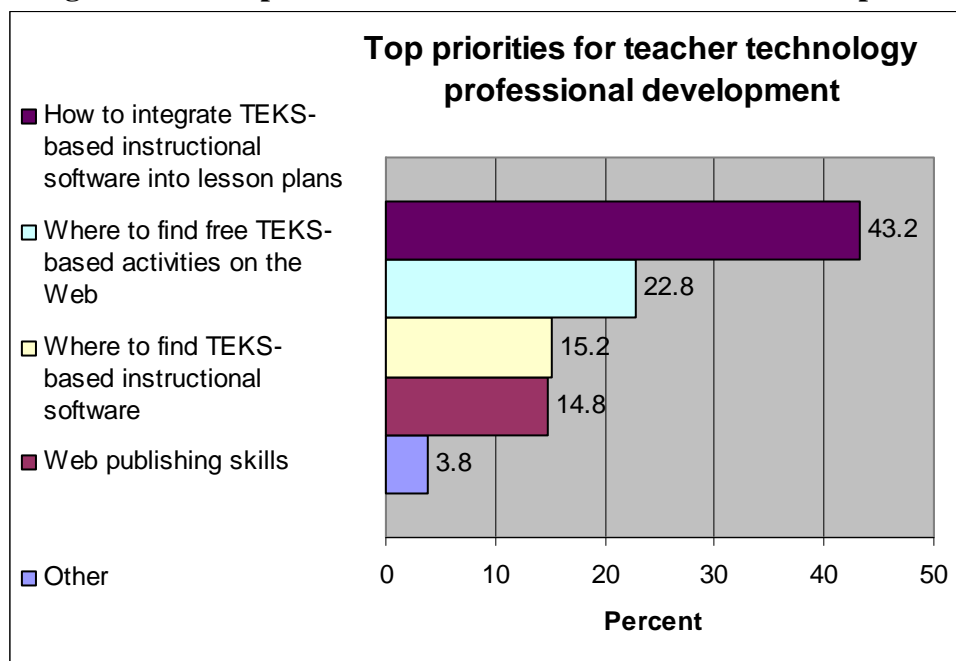


Figure 10.2 – "Other" top professional development priorities

Response	Frequency of Response
How to incorporate technology into TEKS based lessons	34
Engaging students with technology	5
Web page creation for parent contact	1
Higher level skills such as data analysis, benchmark assessments, etc	1
Grading system, email reports	1
Videoconferencing	1

Principals’ Comments on Professional Development

“Having a fulltime Technology Teacher would allow for better instruction of students on basic skills using the computer and expanding their knowledge of the computer and it's capabilities.”

“Unfortunately, teachers are not as comfortable with technology as students and that poses the largest hurdle for us at our campus. My need is time for staff development as well as additional computers in each classroom for student use.”

“Teachers need more staff development and planning time to incorporate GOOD software/Internet sites into lesson plans.”

“Technology is a vast subject and overwhelming to most teachers here. There must be a way for them to be able to fine tune what is there so that it fits their students needs in a time efficient manner. As one of my teachers put it, ‘There is so much out there that I end up not using anything.’”

Teacher Training

Teachers receive little professional development to enhance and encourage the use of technology in the classroom. Nearly two-thirds of respondents report that their teachers receive such training either once a semester or once a year. Each session of training is typically only one or two hours.

Figure 10.3 – Frequency of Training Sessions

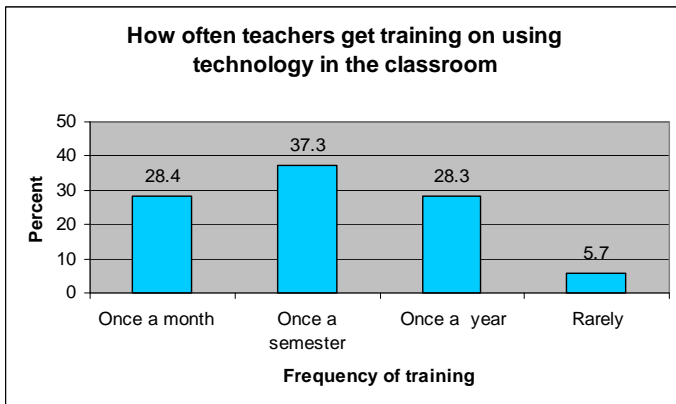
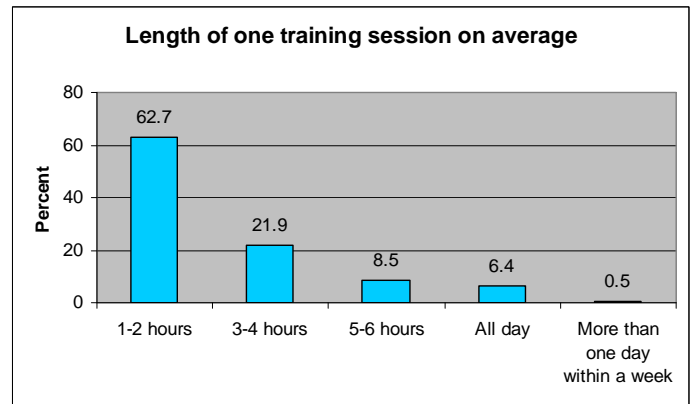
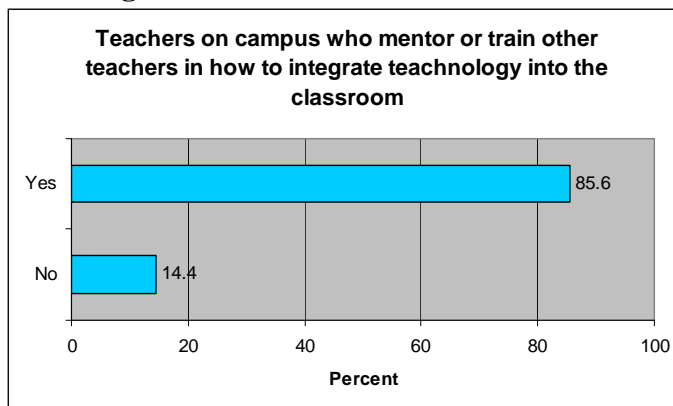


Figure 10.4 – Length of One Session



Thus teachers must often rely on informal peer support. Over 85% of respondents reported that they have teachers on campus that act as mentors to other teachers on integrating technology into teaching. An on-campus technology specialist who can act as an IT support person as well as a technology integration coach was repeatedly requested by principals.

Figure 10.5 – Teacher Mentors



“I need an instructional support person to be there all the time to help teachers with integration of technology in the classroom. I also do not need someone on call for tech problems. I need a full time person ready and on site.”

- Comment from a Texas public school principal

In this chapter:

- Top Priorities for Information Technology (IT) Support
- Level of IT Support

The top IT support priority - reported by nearly 40% of respondents, almost as much as the next two responses combined - was fixing and troubleshooting computer problems. Nearly 30% chose network problems as their top priority, followed by about 16% who cited Internet issues.

Figure 11.1 – Top Priorities for IT Support

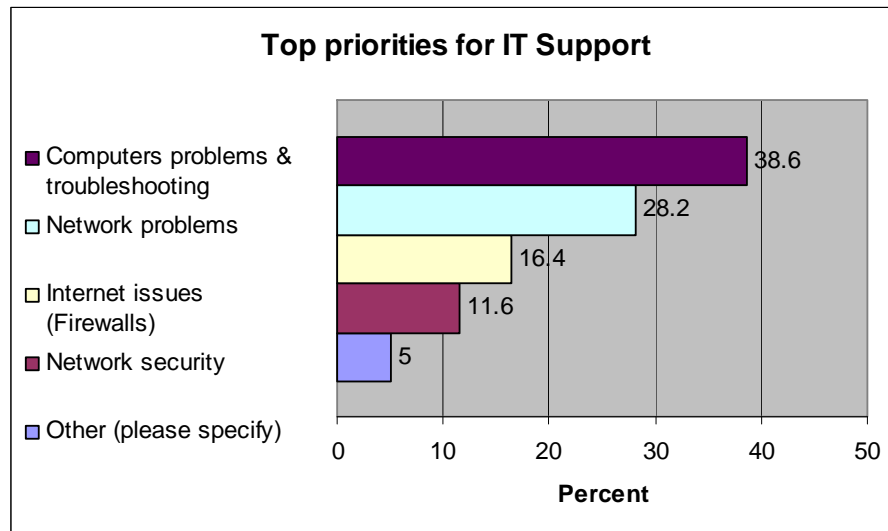


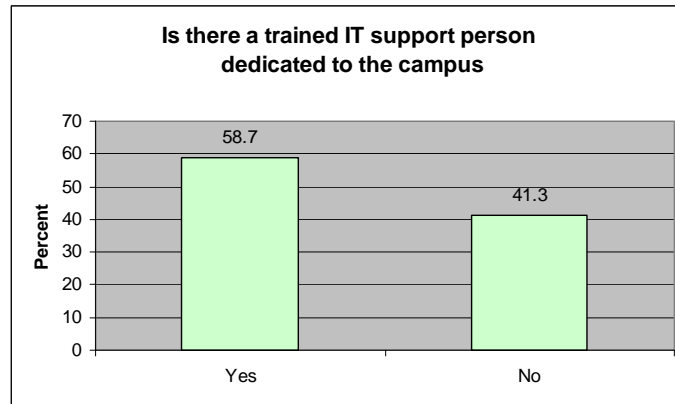
Figure 11.2 – Principals’ “Other” responses to top IT support priorities

Response	Frequency of Response
Integrating technology into classroom	22
Training / Computer Teachers	15
IT staff	14
Good support	13
Programs	7
Printer issues	2

Level of IT Support

Just over 40% of respondents said that their campuses lack dedicated, trained IT support. In free-response comments, principals repeatedly requested on-campus Technology Integration Coaches and/or IT support staff members.

Figure 11.3 – On-Campus IT Person



But there appears to be a disparity between this finding and responses to the following questions. 83% of principals said their campus' IT support needs were met by district-level support. Nearly two-thirds of respondents rated IT support as good or excellent.

Figure 11.4 – IT Support Needs Met

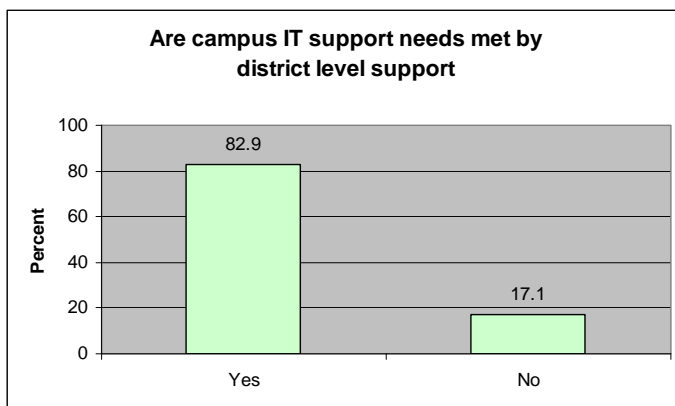
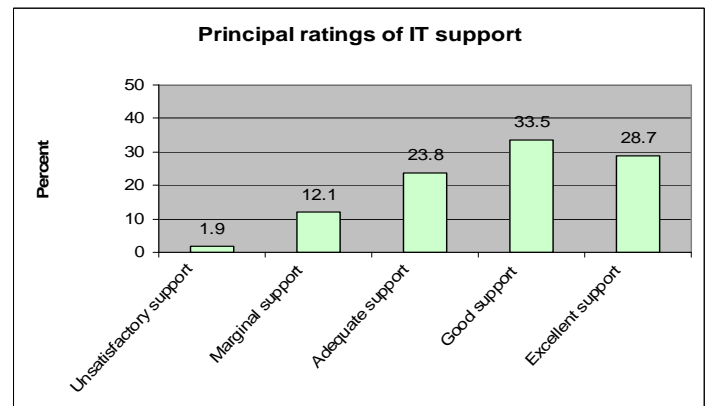


Figure 11.5 – Satisfaction with IT Support



The disparity can probably be explained by the contrast in resources available around the state. While many schools do have their needs adequately met, the ones that do not find the shortfall extremely frustrating. It is heartening to note that where support is available, it is of good quality.

Principals' Comments on IT Support

“There are never enough computers for all students and some are old and need to be replaced. There are always problems with things not working and the district tech person cannot be everywhere at once.”

“On campus IT support. It is very frustrating to have a plan and the technology does not cooperate and you have to do a work order and wait your turn for a district person to come. What about that day's lesson?? So many go with what they can count on being available when planning.”

“An IT specialist is needed at each campus daily so when teachers and students run into problems, they can be solved quickly and they can return to their work. Otherwise, students and teachers become frustrated and are reluctant to use technology in the classroom.”

“I need a district funded CIT on campus to teach teachers how to integrate technology into their classroom to make learning more fun and interesting for students.”

“We need a full time Instructional Technology Curriculum Specialist to help with training teachers on how to seamlessly integrate technology in lesson planning and to research current resources to help with that planning.”

Discouragement when Technology Fails

“We spent extensive time and energy last school year to make sure that every teacher used video streaming, distance learning, virtual fieldtrips, ... but when we tried it in the classrooms the technology would fail. Many teachers were discouraged.”

“Many times teachers do not use technology because there is so little support. They are excited about what can be taught but they get frustrated when the computers or the other equipment is down. The more times they feel this frustration, the less apt they will be to use the computers in the future.”

“Integration is the key. The majority of our students love interactive technology and how interesting it makes learning. I think the future is unlimited.”

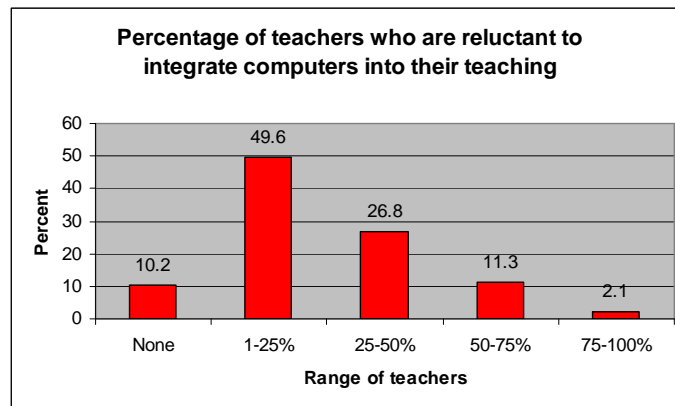
- Comment from a Texas public school principal

In this chapter:

- Teacher Resistance to Technology Integration
- Estimated Percentages of Teachers Reluctant to Use Technology
- Reasons for Reluctance

One barrier to the integration of technology into classrooms is teacher’s reluctance to use it. Approximately 50% of principals said that up to a quarter of their teachers are reluctant to integrate technology into classroom instruction. Another quarter said that 25-50% of their teachers are reluctant to use technology.

Figure 12.1 – Estimated Percentages of Teachers Reluctant to Use Technology



Lack of knowledge regarding how to use equipment and lack of time to prepare technology integration into lesson plans were the two main reasons given. Almost 30% of respondents said that reluctant teachers are not familiar with high-tech equipment or how to use it. Nearly a quarter said that teachers find that it takes too much time to prepare.

Figure 12.2 – Teachers’ Reluctance to Using Technology

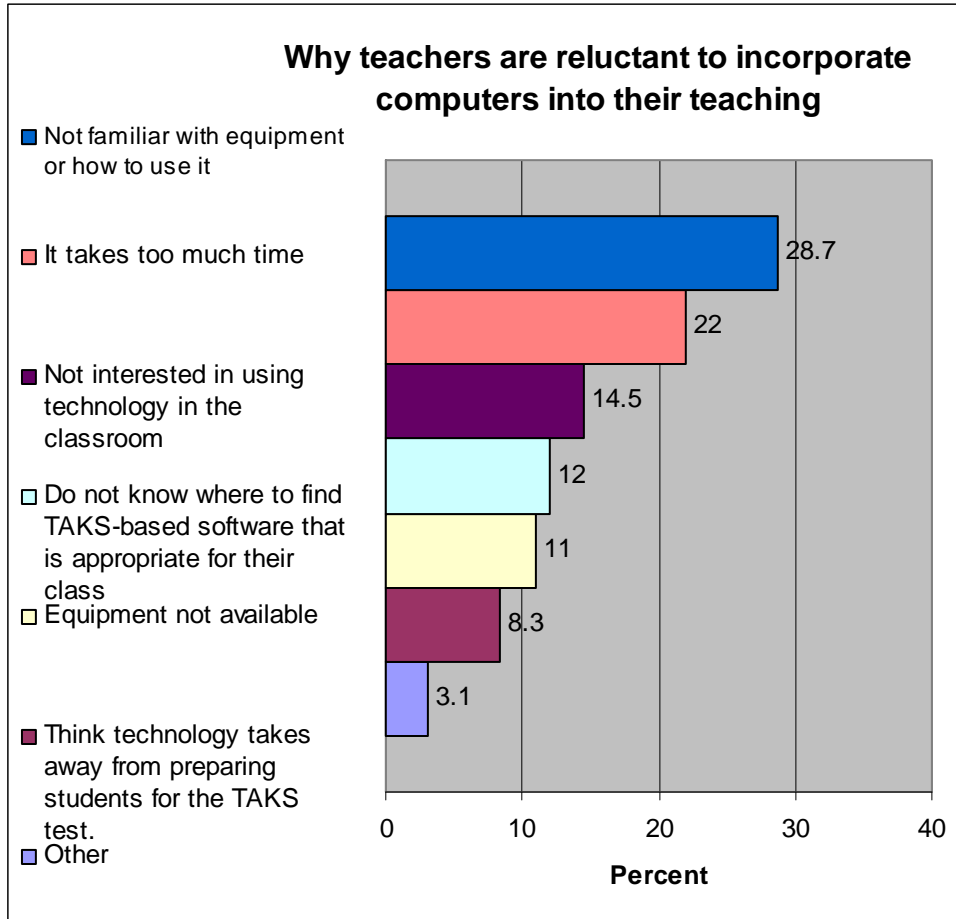


Figure 12.3 – Principals’ "Other" reasons for teachers' reluctance to integrate technology into the classroom

Response	Frequency of Response
Lack of personal technology literacy	12
Fear	11
Easier to use old plans	7
Generation gap	7
Unreliable technology	6
Training needed	4
Technology is more of a distraction. Doesn't help to teach.	3
Not enough time	3
Used by all teachers	2
Not required	2
Scheduling the lab	1
Teachers don't know what to use	1
Too many responsibilities already	1
Focus on TEKS	1
Not enough support	1

Principals' Comments on Technology Integration into the Classroom

“Teachers who have taught for a long time are reluctant to try new things because they have limited skills themselves and are fearful of the expensive equipment.”

“Not interested in using technology in the classroom Think technology takes away from preparing students for the TAKS test.”

“We would welcome TEKS Computer Based Lesson training. Need experts in the field who can train my campus.”

“On-line and/or software for math, writing, language arts, interactive software would enhance students' knowledge in those areas. Funds are needed to purchase the necessary software.”

“Teachers will use technology if it is in their classroom daily and have been trained in the use of the device. However, teachers are more reluctant if they have to share among several other teachers.”

Principals' Comments on Teachers Needing More Time to Focus on Technology Integration

“Teachers need time to plan and time to research web sites that can be used in their curriculum.”

“I have seen students working with certain teachers reap the benefits of being able to utilize technology in real-world ways in order to demonstrate their mastery of TEKS objectives. I think that teachers need time to plan these opportunities”

“There is so much information out there that it is hard to go through all of it. Time is always a factor in getting information and being able to use what you find in the classroom.”

“Teachers need time to write classroom units that integrate technology effectively. They have so many demands on their time.”

“Biggest barrier is the lack of time to expose and train teachers to methods, technologies and possible uses.”

“Parents and students need to be able to access grades, attendance and homework assignments from any location at any time. This will help parents in an educational partnership with their children.”

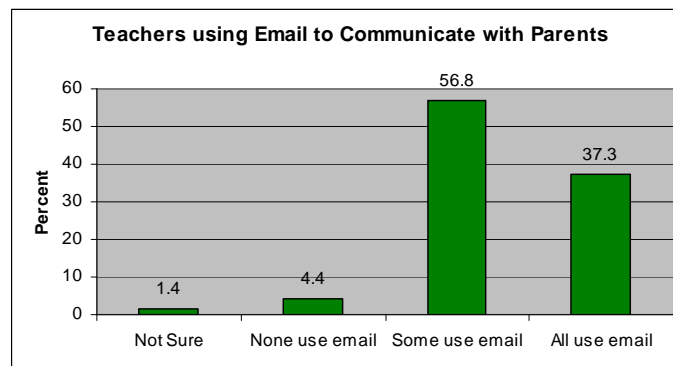
- Comment from a Texas public school principal

In this chapter:

- Email communication between teachers and parents
- Grades posted online
- Student email accounts

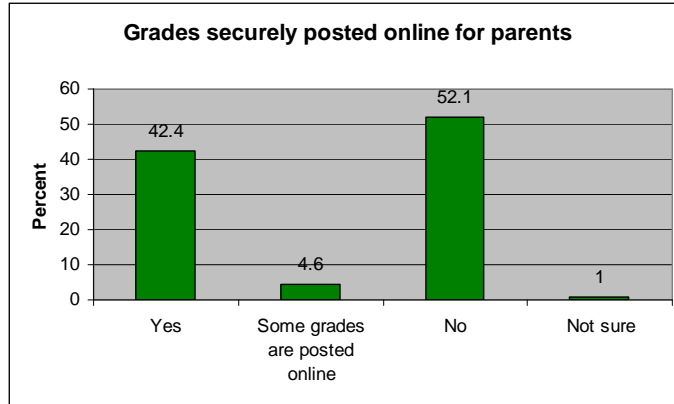
Many free-response comments mentioned technology’s potential to improve communication between schools and families. Our findings indicate that technology is currently underutilized in this arena. Responses regarding email communication between teachers and parents were mixed, with 57% of principals reporting that “Some (teachers) use email” while 37% reporting that “All use email.” This may be linked to some respondent comments about a generation gap between older and younger teachers; younger teachers may be more likely to use email.

Figure 13.1 – Email Communication between Teachers and Parents



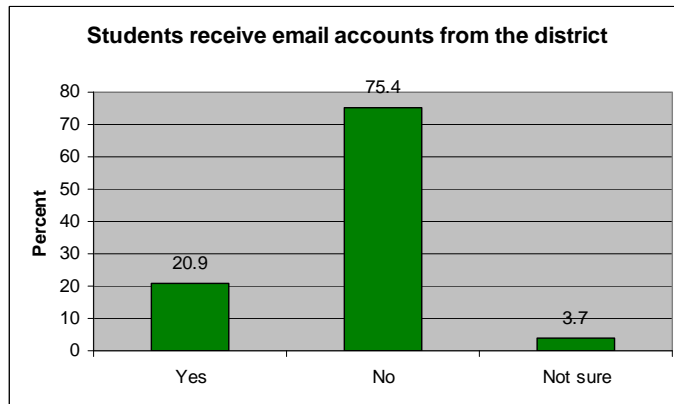
Principals reported that the availability of grades online has a positive affect on parental involvement. However, less than half (43%) of principals reported having grades securely online for their students’ parents. 52% reported that no grades are posted online, and 5% said only some grades are.

Figure 13.2 – Grades Posted Online



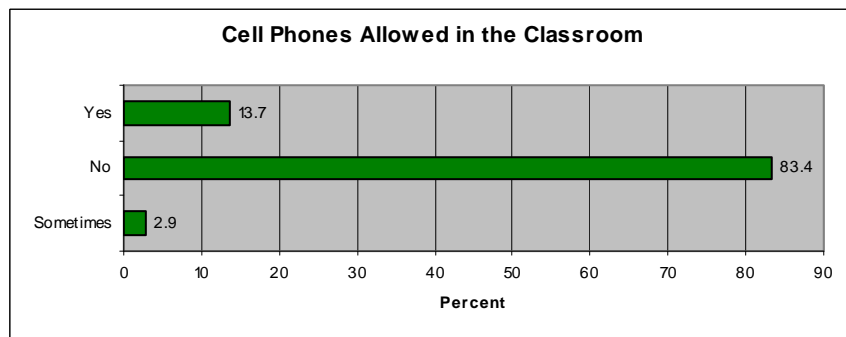
Few schools or districts provide students with email accounts. Three-quarters do not.

Figure 13.3 – Student Email Accounts Provided by District



Overwhelmingly cell phones are not permitted in the classroom; however, approximately 14% of principals reported allowing cell phones inside the classroom.

Figure 13.4 – Cell Phones Allowed in Class



“How can technology help students on your campus learn, and what do you currently need to do that?”

- Survey question

Below are principals’ responses to the question, “How can technology help students on your campus learn, and what do you currently need to do that?” Some of the responses will be familiar to the reader from previous chapters. We offer this comprehensive list of the free-response comments to provide the reader with a sense of nuances impossible to access in fixed-response survey questions and to give the leaders of Texas public school campuses a chance to share what is most important to them.

Summary Statements

“Two things are needed for students to learn appropriately with technology. First, all teachers need to be trained with how to integrate current academic lessons using technology. Second, every student needs to have a computer at their desk so that using the computer doesn't mean changing classrooms or waiting their turn to a computer in the classroom.”

“Give schools individual tech persons, teachers/staff paid tutorials, and money to "refresh" technology every three years.”

“I personally believe that all students need to be issued a laptop to use with all of their assignments but this needs to be supported by more technology people and more training.”

“We need wireless computer carts; laptops; reliable networking and an instructional technology person for each campus. If not for each campus then at least one IT person for every 2 campuses.”

Increased Engagement

“First, technology increases the students' level of engagement. Secondly, it is a window to worlds that a classroom can't visit. Our campus needs a reliable network and more computers. We also need consistent training for teachers.”

“Technology is a motivator for most students. They are interested and it is exciting for them. Students need to see the value of technology as well as the responsibility of appropriate uses.”

“It always excites the students and makes learning more fun and relevant to them.”

“Technology makes learning more engaging. It definitely makes learning more hands-on. It helps teachers change their classroom to be more student-centered.”

“Helps student motivation. Most students would consider computer use a preferred strategy for instruction.”

“I would like to see the students be issued a school quality laptop with the textbooks being on a disk or pen drive. The students seem to learn with a better attitude when they are able to use this type of technology.”

Principals’ Ideas for Advancing Technology in Their Schools

“Need student database with TAKS based benchmark by objective data.”

“We are in the process of building a web page which will permit parents to securely access student grades as well as teacher's lesson plans. This will enable parents to see what students are learning in the classroom and be able to supplement student learning at home.”

“Free up teacher time to attend staff development if you really want them to use it. Require a certain level to continue teaching. Form small groups of peers to teach the others how. Really put some money behind technology like you did construction 10-15 years ago by matching local effort to raise technology bonds/loans to fully integrate tech into the way teachers present lessons and ask the students to solve problem.”

“We get videos on demand for real life lessons in all subject lessons.”

“Laptops for students to check out, especially for low-income students that do not have a computer at home”

“I would like to see state and federal money spent to provide laptops and Internet access to all students on free and reduced lunch.”

“Teachers need a ready list/menu of appropriate instructional websites to go to.”

Partnership with Tech Companies

“I would also like to see a partnership between companies in the technology industry and Texas Public Schools. These partnerships have worked well with private schools, therefore I see no reason they would not work in our public schools.”

“A partnership between the tech companies and the schools funded by increased State dollars will answer most of the issues. This needs to be accomplished with paid release days where "Good Quality" teacher training is delivered by qualified trainers.”

Ideal Campuses

“We have a full array of technology on campus and our computer teacher knows that integration of classroom curriculum and instruction (lesson plans) by grade level is required with full collaboration between classroom teachers and the computer teacher.”

“We have excellent equipment, support, and resources for teachers. It is a district and campus initiative to integrate technology routinely in the classroom. Our IT specialist is housed on our campus and serves several, our campus network coordinator is well trained and responsive, and we have a strong, active technology committee to assist with continued use and integration. More computers is always nice, but not necessary for an excellent program.”

“We are a 1:1 laptop school. Technology helps engage our students at a higher level and for longer periods of time than ever before. It helps them reach higher levels of cognition and see application for their learning. It helps them achieve 21st century skills.”

No Computer at Home

“Most students do not have a computer at home. Greatest need is computers at home.”

“The majority of our students do not have computers at home because they cannot afford one. School is the only place they have access to computers but when we have a limited number of computers in classrooms, it is difficult to enhance their learning. Technology is the basis for futuristic learning...and needed in schools now.”

“Another problem is the student and parents access to Internet after school, the city could make it available to the community through wires means, which would help the family’s that do not have access from home to the Internet.”

“Most of our children are disadvantaged and their parents do not have technology at home, so there is not much support for this at their homes.”

“In our lower socio-economic & high mobility area few parents and homes have Internet access. All of my teachers keep updated web pages, but I doubt many parents access them because of inability.”

Uses of Technology in the Classroom

“Technology can do much of our individual tutoring and remediation as well as enrichment, elaboration and concept teaching and practice.”

“Technology can assist with vocabulary development, skills building, creative writing, projects such as power point and spread sheets.”

“Technology can help our students practice their TAKS skills in all tested areas.”

“Technology can assist teachers in addressing the higher thinking skills, provide greater interest level to students, present material in different format to address varying learning styles, provide information/research to students and teachers in a more timely manner”

“Probably the greatest contribution technology can make to my students is exposure to students from other parts of the country and world.”

“Technology allows our students to explore and research topics that they are learning in the classroom.”

“Technology can expand our students' capability to "look" at the world through virtual field trips, distance learning, teaching partnerships room to room, and learning how to use the web responsibly and critically.”

“Instant results from assessments, Record Grades, attendance, district curriculum, streaming video, generate reports, We currently have the software to do this, it is just finding the time to utilize it all.”

“Technology can help students by providing access to research cites, providing teachers with access to information which supports their lessons, and providing computer assisted instruction/reinforcement.”

“Technology can motivate many students to engage in the learning, provide real world real time applications, provide instant feedback, and bring students to many places virtually providing experiences they might not ever be able to have otherwise just to name a few.”

Comparison of Results to STaR Chart Findings

2005-2006 Campus STaR Chart

TEA developed the Texas Teacher STaR Chart, which surveyed 7,602 campuses in Texas. The STaR Chart was developed around the four key areas of the *Long-Range Plan for Technology, 2006-2020: Teaching and Learning; Educator Preparation and Development; Leadership, Administration and Instructional Support; and Infrastructure for Technology*. The STaR Chart's goal is to help teachers, campuses, and districts determine their progress toward meeting the goals of the *Long-Range Plan for Technology*, as well as meeting the goals of their district. (<http://starchart.esc12.net/history.html>)

The STaR Chart is broken down into four categories: *Teaching and Learning, Educator Preparation and Development, Administration and Support, and Infrastructure*. Across three out of these four categories, the STaR Chart classifies Texas overall as “Developing Tech”. The fourth category, *Infrastructure*, is split with 43% of the state labeled “Advanced Tech”. The table below details the STaR Chart averages for Texas, gives descriptions for each, and lists consistencies with this survey.

STaR Chart Categories	Teaching and Learning	Educator Preparation and Development	Administration and Support	Infrastructure
Average STaR Chart Classifications For Texas 05-06	5144 Texas schools (67.8%) labeled: “Developing Tech”	4761 Texas schools (62%) labeled: “Developing Tech”	4408 Texas schools (58%) labeled: “Developing Tech”	3668 Texas schools (48.3%) labeled: “Developing Tech” 3245 Texas schools (42.7%) labeled: “Advanced Tech”
Description (taken from STaR Chart)	<u>Developing Tech</u> Instruction is teacher-directed and students regularly use technology on an individual basis to access electronic information and develop communication and presentation projects. There is minimal use of technology in foundation TEKS . Most Technology Applications TEKS are met K-8; high school campuses teach at least 2 Technology Applications courses.	<u>Developing Tech</u> Use of technology is for administrative tasks and classroom management. There is use of online resources. 40% of educators meet SBEC (State Board for Educator Certification) standards. Administrators expect teachers to use technology. 6-24% of technology budget allocated for professional development.	<u>Developing Tech</u> Campus plan aligned with Long-Range Plan for Technology. Teachers and administrators have vision for technology. One technical support staff to 750 computers. There is a full-time district technology director. The Technology Allotment and local funding is used for purchases.	<u>Developing Tech</u> There are 5-9 students per computer. There is direct connectivity to the Internet in 50% of classrooms and library. Most rooms are connected to WAN/LAN. One educator per computer, shared use of other resources. <u>Advanced Tech</u> There are 4 or less students per computer. There is direct connectivity to the Internet in 75% of classrooms and library. Web-based learning is available. All rooms are on LAN/WAN. There is one educator per computer. There is shared use of other resources
Texas Technology Inventory 2007	96% of principals reported a 1-to-1 ratio of student to computer in a computer lab. Top requested prof. dev. priority was integrating technology into TEKS.	96% of principals reported teachers have own computers for grades, assignments, etc. 40% of principals said over half use online resources.	Technology Allotment was most frequent response for sources of funding. Survey respondents were mostly satisfied with IT support.	The survey found approximately 1-3 computers per classroom with a ratio of 4-5 students per computer. LAN/WANs were found to be the primary networking method (80%) with wireless second (20%). Resources are definitely shared.

Survey Development

The goal of the survey was to provide policy makers with current data and statements from principals regarding the state of educational technology in their schools. A team developed the survey to answer the question of what do Texas schools have in terms of technology in the classroom, specifically looking at computer hardware, software, professional development, IT support, and technology integration into lesson plans. The team was also interested in finding out what principals' thoughts were regarding their greatest needs for technology integration on their campuses.

A list of principals' email addresses was obtained from the TEA Website (<http://askted.tea.state.tx.us/>). The list included the names of approximately 7,800 principals, but only about 1,300 emails. Thus, our team searched school websites for principal email addresses. An email to Texas principals was composed in conjunction with State Representative Mark Strama's office. Three sets of survey emails were sent out in late 2006. The first was sent to 5,211 principals; approximately 800 emails did not reach the intended recipient. After two weeks of searching for more email addresses, the survey was emailed to a second list of 850 principals; approximately 150 of these emails failed. After analyzing how representative the survey results were, it was concluded that ESC 1 was underrepresented. The team then emailed the survey to 67 ESC 1 principals; 20 principals or administrators responded, increasing the ESC 1 response rate to more appropriate levels. The total number of survey responses for the survey was 1,116; however, 108 responses were thrown out because they were outside the scope of this survey. This survey focused specifically on Texas K-12 public schools; therefore alternative schools, private schools, day care sites, etc., were not included. The final number of responses was 1,008.

The survey was online and composed of 52 questions (Appendix A). The questions included single-response questions, checklists, and open-ended questions. We submitted the survey for review by several professors at the University of Texas at Austin, requesting suggestions on how to make the survey as clear and as informative as possible. The survey was also reviewed by TEA for overlap with the STaR Chart and to cover anything missing from the survey. The final version of the survey was pilot tested with an Austin-area public school principal.

The results were categorized geographically by ESC region. Averages were calculated for each question and placed into a table which compared the results of each item to the corresponding ESC region data. Very low variances were found between ESC regions' responses on the survey. In addition, there were no significant differences between geographic regions. This implies that each geographic region answered the survey with similar responses. However, it must be noted that the survey frequently asked principals to estimate a range, such as the number of computers in a school, and therefore error exists because the results are based on estimations of ranges.

The results of the survey were also compared by rate of economic disadvantage – between high economic disadvantaged areas and low economic disadvantaged areas. Again, no significant differences were found between regions. A more comprehensive survey asking for exact number of

technological resources is needed. However, significant barriers to completing such a survey exist, including the time required to complete such a survey and the constant change in the number of working computers, projectors, etc. This survey is a reasonable starting point.

Limitations of the Survey

Certain limitations of the study need to be noted and addressed. While the results were shown to be relatively consistent with the population of schools in each ESC, the following are potential sources of error that could affect the accuracy of the results.

First, our sample was neither random nor entirely complete. Approximately 1,600 principals were not emailed. These principals were not emailed due to time constraints and a lack of available email addresses. Many small districts (1-5 schools) did not post email addresses on their websites if they had a site, nor was this information listed in the data obtained from TEA. We therefore could not include them in this survey. Additionally, many districts of various sizes use web-based email contact forms, which prevented us from being able to harvest the email addresses of their principals. Finally, of the 6,000 survey emails sent, about 1,000 bounced back due to incorrect spellings, personnel changes (“no such user”), and other reasons impossible to know or correct for.

Another potential source of error is lack of access to electronic resources. The Executive Director of the Amarillo ISD Office of Technology had an excellent insight about generalizing the results of this survey and the STaR Chart to all schools in Texas:

Many districts have high poverty area campuses that typically will have more technology available to their students (because of Title 1 funding availability) than low poverty area campuses which have to depend solely on local funding for technology. Therefore there is a disparity in the ability of campuses to provide equal technology opportunities.

District wide standardization and software support widely varies from district to district. This creates a very difficult environment in which to draw specific conclusions about strategies and directions to move a specific campus in.

A third potential source of error is principals’ adjustment of resource totals. The emails sent to principals asked what they need in terms of technology; thus, a possible source of bias could be principals giving low estimates on responses to questions like “how many computers do you have” in hope of getting more technology funding.

A fourth potential source of error is that many schools did not fit into the survey’s grade level classifications. A question on the survey asked principals to classify their campus by Primary, Middle (junior high), High school, or other. Approximately 11% of schools choose “Other”. For example, there are many schools in Texas that are K-12, 5th grade through 8th grade, or 6th grade through 12th grade. So these schools could not be utilized in the analysis we performed to check for sample representativeness.

Finally, some responses came from the district level rather than from a particular campus. These responses required interpretation because this survey was intended for principals.

Overall, we believe our results are accurate because of the consistency between the population of Texas schools and the sample population of the survey, as well as the consistency of our results with the 2005-2006 STaR Chart findings. But future research may address and account for these limitations.

Directions for Future Research

Numerous improvements for future studies were noted throughout the survey. We now have a better understanding of how to use the online survey technology more efficiently. This will greatly increase the efficiency of data analysis. In future surveys respondents could be asked to include their zip code, which will increase researchers' ability to analyze the data with detailed geographic functionality such as integrating the data with Google Earth maps. A technology resource score could be calculated for schools and ESCs. This score could be illuminated on a map of Texas with green lights for technology-rich schools and red lights for technology-poor schools. Such a map would give a visual representation of technology resources across Texas.

Future studies might also have a wider array of choices for grade level classification. The three standard choices of elementary, middle, and high school are the most common, but such a scheme excludes a significant number of Texas schools. The survey either needs to have clear definitions and answer choices for different grade levels, or the principals should choose from a range of grades in their school.

Finally, the answer choices for the question "How many computers are in each classroom on average?" need to be modified. Single choices (1 computer, 2 computers, etc.) need to replace the choices that give ranges of computers to choose from (1-3 computers, 4-6 computers, etc.). This will increase the accuracy of this question and others.

Nearly half of the 1,008 respondents agreed to participate in future studies.

Respondents agree widely on four key needs:

- **Need for a Central Repository of High-Quality Technology Resources:** Teachers do not have time to search for or evaluate educational materials. They need a complete and reliable source of high-quality lesson plans, activities, and best practices that have been systematically evaluated and will help prepare students for the TAKS test.
- **Need for On-Campus Technology Specialists:** Each campus needs an on-site technology specialist to help teachers integrate technology into their lesson plans, fix hardware and software problems when they arise, and manage continuing technology integration.
- **Need for Laptops, Not Desktops:** Mobile laptop carts are a more efficient way of integrating technology into classrooms. Laptops are more flexible and provide a more efficient method of distributing and sharing computers among students.
- **Need for Online Grade and Assignment Portals:** Each school needs to have assignments and grades available online in a secure format so that parents can stay informed and be more active partners in their children's education.

The Need for a Central Repository of High-Quality Technology Resources

Survey respondents requested that the state develop an online repository of appropriate technology-based instructional resources for teachers. Many teachers have limited access to professional development opportunities, so they do not know how to integrate TEKS-based instructional activities into their lesson plans. In addition, with so many software packages and online activities available in the marketplace, and so few credible evaluations of these tools, teachers understandably become overwhelmed and revert back to the tried and true lesson plans of years past. An online repository of TEA-approved resources with downloadable lesson plans, activities, best practices, and comprehensive instructions would address both problems. This repository would need to be updated frequently and offer the best TEKS-based multimedia and interactive activities available. Ideally these downloadable activities would be empirically evaluated for learning gains, motivational effects, and overall usability. In other words, teachers would be able to feel confident that these activities would help students prepare for and succeed on the TEKS exam.

These resources should be available free of charge, include downloadable activities based on TEKS standards, and provide detailed instructions with examples on how to use these resources in class. A brief video clip of a teacher using the technology and the lesson plan activities would provide the best visual for a teacher preparing a similar lesson. The lesson plans need to be organized so that a teacher can quickly search by grade level, subject matter, or by a specific TEKS requirement. The teacher should be able to save and share the lesson plans they use. In addition, teachers need to be able to provide feedback and suggested lesson plans. A Wiki (an online collaboration model and tool that allows any user to edit some content of webpages through a browser-based interface) or a blog would

be an efficient and inexpensive platform open to the community of Texas teachers to develop and discuss various educational activities for specific TEKS-curriculum requirements.

The Need for On-Campus Technology Specialists

The second area of technology resources that principals consistently felt they needed help with is information technology (IT) support. Each semester most teachers across the state receive an average of 1-2 hours of professional development to help develop strategies for integrating technology into their teaching. This is simply not enough training to fully incorporate technology activities and tools. Some campuses have hired a full time, on-campus Technology Specialist who can help teachers integrate appropriate TEKS-based technology into their lesson plans and troubleshoot IT problems. “I need an instructional support person to be there all the time to help teachers with the integration of technology in the classroom. I also need someone on-call for tech problems. I need a full time person ready and on-site,” stated a principal. Teachers would benefit from ongoing support on how to use technology in their classrooms. They need a trusted and approachable specialist who can advise them on a daily or weekly basis. In addition, a Technology Specialist would be very familiar with the campus and would be in a good position to help plan and execute that campus’s long-range technology plan.

The Need for Laptops, not Desktops

Principals consistently reported that technology increases students’ motivation in instructional activities and enhances learning. “Technology makes learning more engaging. It definitely makes learning more hands-on. It helps teachers change their classroom to be more student-centered,” said one principal. Another principal stated, “Most students would consider computer use a preferred strategy for instruction.” The top technology priority for principals was obtaining more computers in the form of mobile laptop carts. Mobile laptop carts are portable computer labs consisting of 10-25 laptops that students can use during lessons. These carts eliminate the disruption and loss of instructional time caused by moving the class to a computer lab. Most of the principals surveyed would like to see laptops in the classrooms because of their portability. Many of the principals also stated that students can extend what they are learning through filtered access to the Internet. Principals stated they have also seen success in providing students with individual laptops, which allow students to work at their own pace while teachers facilitate their progress and give those who need it more individualized instruction. Further, principals feel that laptops would be easier and cheaper to update than textbooks.

Respondents indicated that their computer labs are over-scheduled due to the high number of teachers who want to use computers as part of their classroom instruction. Most schools have only one or two computer labs on campus. Inside these computer labs there are, on average, 20-30 personal computers (PCs). Eighty percent of principals reported that 75-100% of their student computers have modern operating systems such as Windows XP. This helps us determine the age of computers being used in these schools. 73 % of principals reported that 75-100% of student computers had Microsoft Office or an equivalent installed. Inside regular classrooms there are on average only 1-3 computers. 80% of principals reported that every classroom has at least one student computer connected to the Internet. Yet, two-thirds of principals reported that they have fewer than three computers in each classroom available for student use. Similarly, one-third of principals reported that not every student has an opportunity to use a computer for instructional activities.

The Need for Online Grade and Assignment Portals

Principals had many good ideas about how to improve teaching and learning within their schools. Perhaps the simplest and most important is providing online grading and assignment portals. As one principal stated, “Parents and students need to be able to access grades, attendance, and homework assignments from any location at any time. This will help parents in an educational partnership with their children.” The importance of positive parental involvement cannot be overstated. Currently, only 43% of principals reported having grades available online in a secure format for parents and students. This technology simply has to be shared, secured, and supported in order for it to become a reality for all schools, and there should be no doubt that every school in Texas should offer this simple, powerful tool. Further, only 37% of principals reported that all of their teachers use email as a means to communicate with parents. Email has become a reliable and favored means of communication, especially for people whose packed schedules make face-to-face meetings difficult – like teachers and working parents. Online grades and email communication provide new ways for parents to engage in their children’s school lives. These two efficient technologies already exist, are inexpensive, and are not being fully utilized. Texas parents are being deprived of these opportunities to fully participate in their children’s education.

Ideally, school websites will provide parents with a place where they can not only see grades, attendance, and assignments, but interact with teachers. Multiple Internet chat platforms already exist which are adequate for teacher/parent conferencing. Online video technology is also promising; while the infrastructure needed for videoconferences is still somewhat expensive, videoconferences between parents and teachers would provide an even richer medium in which these two key groups can communicate about students’ educational issues. Additionally, if the parent and teacher schedules do not match, they should be able to use online discussion boards to communicate about the student’s progress in class. These online communication innovations are far too efficient, inexpensive, and productive to be ignored any longer. They foster parental involvement in children’s lives and give parents the freedom to access their children’s progress in school on their own time.

Need for Further Study

The goal of this survey and report is to inform Texas policy makers on the present status of technology resources within K-12 public schools and to recommend actions for advancing the integration of technology into schools. The survey highlights the fact that Texas classrooms are far away from the goal of full integration of technology in the classroom. It also highlights the need for further study on the subject. The bottom line is that it is time for the state to develop a comprehensive plan for the integration of technology into the classroom so our students can remain competitive in our current global economy.

A

Appendix A – Survey Instrument

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Campus Demographics

While we know some of this information is available elsewhere, it is important to collect for this study.

1. What is your title?

Principal
Assistant Principal
Administrative Assistant
IT specialist
Other (please specify)

2. What level is your campus?

Primary school
Middle school
High School
Other (please specify)

3. How many students do you have on your campus?

10-200
201-400
401-600
601-800
801-1000
1001-1200
1201-1400
1401-1600
1601-1800
1801-2000+

4. How would you classify your campus?

Large city
Mid-size city
Urban fringe of a large city

- Urban fringe of a mid-sized city
- Large town
- Small town (population of at least 2,500 but less than 25,000)
- Rural (population of less than 2,500 outside)

5. What percentage of your students qualify for free or reduced lunch?

- 10-30%
- 31-50%
- 51-70%
- 71-90%
- 90+%

6. What sources of funding are used for technology expenditures?

Check all that apply:

- E-rate
- Bonds
- TIF money
- Technology allotment
- Supplement with local funds
- M & O (Maintenance and Operations)
- Not sure
- Other (please specify)

Hardware

7. What types of technologies does your campus have available for teachers & students?

Check all the apply.

TV:

- Cable TV
- VHS tapes and player
- DVD discs and player
- Video-On-Demand system

Presentations:

- Overhead projector for transparencies
- Digital projector for PowerPoint presentations
- Interactive whiteboards

Videoconferencing:

Ability for off-campus teachers to teach on-campus students via video

Computers

Each teacher has his/her own computer to keep grades, create assignments, etc

Each classroom has 3+ computers that students can use for class papers and projects
Every student has an opportunity to use a computer for instructional activities
There is at least one computer lab on your campus with at least 10 computers connected to the Internet.

11. Can students have cell phones in the classroom?

Yes
No
Sometimes

Computer Hardware

12. How many computers (PCs & Macs) do you have on your campus for student learning?
Do not include computers used by administrators. Include computers only used for learning.

1-15
16-30
31-45
46-60
61-75
76-100
101-150
151-200
201-250
251-300
301-350
351-400
401-450
451-500
500-1,000
1,000+

13. Would you say the majority of these computers are PCs or Macs?

PC
Mac
Not sure

14. How many computers are in each classroom on average?

1-3 computers per classroom
4-6 computers per classroom
7-10 computers per classroom
10+ computers per classroom
Not sure

15. How old are these computers on average?

- 1-3 years
- 4-6 years
- 7-10 years
- Not sure

Laptops

16. Does your campus provide laptops to students?

- Yes
- No
- Unsure

17. If yes, what percentage of students receive laptops?

- None
- 1-25%
- 25-50%
- 50-75%
- 75-100%
- Not sure

18. Are the students allowed to take the laptops home?

- Yes
- No
- Sometimes

19. Do all of these student laptops have wireless Internet connectivity?

- Yes
- Some
- No

Computer Labs

20. Does your campus have a computer lab? (A computer lab is a room dedicated for students to use computers for instructional activities.)

- Yes
- No

21. If yes, how many labs do you have on your campus?

- 1
- 2

- 3
- 4
- 5+
- Not sure

22. On average how many computers are in each lab(s)?

- 1-10
- 11-20
- 21-30
- 30+
- Not sure

23. When a computer lab is in use, what is the ratio of students-to-computers? In other words, how many students generally work at one computer?

- 1 student to 1 computer
- 2 students to 1 computer
- 3 students to 1 computer
- 4+ students to 1 computer
- Not sure

24. Does your campus have a mobile computer lab? (A cart with a classroom set of laptops)

- Yes
- No
- Not sure

Computer Carts

25. Does your campus have computer carts? (mobile presentation stations for teachers)

- Yes
- No
- Not sure

26. If yes, how many computer carts does your campus have?

- None
- 1
- 2
- 3-4
- 5-6
- 7+

27. What are the three greatest priorities in terms of technology hardware for your campus?

Check your top three priorities.

- Computers
- Laptops
- DVD players
- Interactive whiteboards
- Projectors for PowerPoint presentations
- Videoconferencing
- Digital cameras
- Digital video equipment
- Graphing calculators
- Student response systems
- Handheld devices
- Other (please specify)

Web/Internet

28. Do students receive an email account provided by the district?

- Yes
- No
- Not sure

29. What percentage of student computers have access to the Internet?

- None
- 1-25%
- 25-50%
- 50-75%
- 75-100%
- Not sure

30. What type of Internet connection does your campus have?

Check all that apply:

- Dial-up
- ISDN
- Satellite
- Cable
- DSL

- T-1
- T-3
- Not sure
- Other (please specify)

31. How do student computers connect to the Internet?

- Check all the apply.
- Local Area Network (Ethernet cable to the wall)
- Wireless
- Not sure
- Other (please specify)

32. Does every classroom on your campus have at least one computer for students to access the Internet?

- Yes
- No
- Not sure

33. What is your campus' policy regarding students accessing the Internet?

- Check all that apply.
- No Restriction: students use the Internet with no filters.
- Semi-Restriction: students' Internet use is filtered using keywords
- Full Restriction: students cannot visit sites on the Internet
- Intranet only: students access programs on school's internal network
- Not sure
- Other (please specify)

34. At what level does Internet filtering take place?

- Check all that apply.
- Individual computers
- Campus
- District
- Education Service Center (ESC)
- Not sure
- Other (please specify)

Software

35. Are student computers equipped with modern operating systems, such as Windows XP or Mac OS?

- Yes
- No
- Not sure

36. What percentage of student computers have Microsoft Office or the equivalent installed? (word processor, spreadsheet software, and presentation software)

- None
- 1-25%
- 25-50%
- 50-75%
- 75-100%
- Not sure
- Other (please specify)

37. Where do teachers get the software they use for instruction?

Check all that apply.

- Provided by the state
- Provided by the district
- Received with textbooks (textbook publishers)
- Purchased from technology companies
- Used free online instructional applications
- Paid to use online software
- Developed own software
- Other (please specify)

38. What percentage of teachers do you estimate use Web-based educational activities in their classrooms?

- None
- 1-25%
- 25-50%
- 50-75%
- 75-100%
- Not sure

39. What percentage of teachers do you estimate use PowerPoint presentations in their classrooms at least once a week?

- None
- 1-25%
- 25-50%
- 50-75%

75-100%
Not sure

Professional Development

40. How often do teachers receive training on how to use technology in their classrooms?

Once a month
Once a semester
Once a year
Rarely, if ever

41. How extensive is one session of training on average?

1-2 hours
3-4 hours
5-6 hours
All day
More than one day within a week

42. Are there teachers/staff on your campus who mentor or train other teachers on how to integrate technology into their classrooms?

Yes
No

43. What professional development is most needed for your teachers?

Check your top choice.

Basic computer literacy (Word, Excel, PowerPoint)
Where to find TAKS-based instructional software
How to integrate TAKS-based instructional software into lesson plans
Where to find free TAKS-based activities on the Web
Web publishing skills
Other (please specify)

IT Support

Almost done!

44. Does your campus have trained IT support person dedicated to your campus?

Yes
No

45. If not, are your campus IT support needs being met by district level support?

Yes
No

46. How would you rate IT support you receive?

Unsatisfactory Support	Marginal support	Adequate support	Good support	Excellent support
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47. What kinds of IT support technology does your campus need?

Check all that apply.
Network problems
Network security
Internet issues (Firewalls)
Computer problems and troubleshooting
Other (please specify)

Technology Integration

Last page!

48. What percentage of teachers do you estimate are reluctant to integrate computers into their teaching?

None
1-25%
25-50%
50-75%
75-100%

49. For those teachers that are reluctant, why do you think they do not incorporate technology into their teaching?

Check the top three reasons.

It takes too much time
Equipment not available
Not familiar with equipment or how to use it

Do not know where to find TAKS-based software that is appropriate for their class.
Not interested in using technology in the classroom
Think technology takes away from preparing students for the TAKS test
Other (please specify)

50. Do teachers use email to communicate with parents?

All use email
Some use email
None use email
Not sure

51. Are grades posted online for parents to securely access?

Yes
Some grades are posted online
No
Not sure

That's it!

Thank you for your participation in this survey. Your responses will help us better understand the technology resources currently available in Texas public schools. The survey results will contribute to the formulation of appropriate policy decisions in the future.

53. Please check the box below if you do not mind being contacted to participate in future studies.

Yes, include me in future studies.

B**Appendix B – Sources of Funding**

The table below illustrates commonly used sources of funding for technology expenditures.

Table 1 – Sources of Funding for Technology Expenditures

Source of Funding	Description	Website
E-Rate	<p>E-Rate is a federal discount program that provides schools and libraries with affordable access to advanced telecommunications services. The program provides discounts ranging from 20% to 90% on Telecom Services, Internet Access, Internal Connections, and Basic Maintenance of Internal Connections to eligible schools and libraries. There is a \$2.25 billion annual cap.</p> <p>Public schools, school districts, charter schools, private schools and libraries are eligible to apply for discounts each year of the program. Discounts are provided in two priorities. Priority I includes telecommunication services and Internet access. Priority II includes Internal Connections and Basic Maintenance. The discounts range from 20 to 90 percent of the costs of eligible services, depending on the level of poverty, as determined by the percentage of children eligible for the National School lunch Program, and the urban/rural status of the population served.</p> <p>To be eligible to receive discounts, applicants must have an approved technology plan. The technology plan explains how technology will be used to improve student learning and addresses professional development strategies to ensure staff knows how to use the technologies to improve education. It must include an assessment of the telecommunication services, hardware, software and other services needed to improve education. The plan and an evaluation process to enable the school or library to monitor progress towards specified goals.</p> <p>E-Rate also requires yearly evaluation and update of a district’s progress towards the goals of the technology plan. The update process allows districts to update their plans and to print out a certificate showing the date of the update.</p> <p>Public school campuses and public charter</p>	<p>http://tpesc.esc12.net/erate/default.html</p>

	schools are required to complete an online “Texas STAAR Chart” to be eligible for E-Rate and NCLB funds. All campus STAAR Charts must be completed before a district can submit their ePlan for either approval or updates.	
TIF Money	The Telecommunications Infrastructure Fund (TIF), established by the Legislature in 1995, aids in the development of the telecommunications infrastructure of public schools, public libraries, higher education, and medical facilities. Capped at \$1.5 billion dollars of funding over ten years.	http://www.tcea.org/TIF/default.asp
TARGET Grants	(Technology Applications Readiness Grants for Empowering Texas students and teachers initiative) The program is a local response of Enhancing Education Through Technology to the No Child Left Behind Act of 2001.”	http://www.tea.state.tx.us/technology/target/index.html
Technology Allotment	<p>“All school districts in Texas receive a technology allotment for the purchase of technology in support of the goals of The Long-Range Plan for Technology.”</p> <p>“Technology Allotment funds flow to the district from TEA, and the district is held accountable for the use of those funds. How the funds are distributed in a district is a local decision, at the district level.”</p>	http://www.tea.state.tx.us/technology/allot/index.html
Title I	“Title I, a provision of the Elementary and Secondary Education Act (ESEA) which went into effect on July 1, 1995, provides money to help educate poor children. 92% of the nation's schools districts, and 48,000 schools get Title I grants, according to the Education Department.”	News Website: http://www.stateline.org
Technology Immersion Pilot (TIP)	TIP leverages Title II, Part D (NCLB) federal technology funds to support immersion implementation at 23 school districts around Texas. Funds are made available to schools on a competitive grant basis.	http://www.txtip.info/abouttip.html
Maintenance & Operations	Funds provided through taxation.	

C

Appendix C – Survey Response Data compared to Texas’ School Population

Table B.1 – TEA’s STaR Chart data: Number of Schools by Grade Level
[\(http://starchart.esc12.net/\)](http://starchart.esc12.net/)

ESC	NAME	ELEM	MID	HS	TOTALS	% of Total Schools
1	Edinburg	330	90	73	493	6.6%
2	Corpus Christi	132	50	40	222	3.0%
3	Victoria	81	25	33	139	1.8%
4	Houston	805	249	166	1220	16.2%
5	Beaumont	96	36	32	164	2.2%
6	Huntsville	159	81	65	305	4.1%
7	Kilgore	222	87	88	397	5.3%
8	Mt. Pleasant	89	31	38	158	2.1%
9	Wichita Falls	75	20	31	126	1.7%
10	Richardson	675	188	170	1033	13.7%
11	Fort Worth	470	161	127	758	10.1%
12	Waco	190	67	67	324	4.3%
13	Austin	330	98	95	523	7.0%
14	Abilene	76	26	35	137	1.8%
15	San Angelo	83	20	39	142	1.9%
16	Amarillo	129	41	45	215	2.9%
17	Lubbock	99	30	43	172	2.3%
18	Midland	100	27	36	163	2.2%
19	El Paso	149	40	41	230	3.1%
20	San Antonio	381	107	106	594	7.9%
SUM		4671	1474	1370	7515	100.0%
AVERAGE		62.2%	19.6%	18.2%	100.0%	

**Table C.1 – Survey Results: Number of Responses
from Schools by Grade Level**

ESC	NAME	ELEM	MID	HS	TOTALS	% of Total Response
1	Edinburg	33	9	8	43	5.0%
2	Corpus Christi	11	4	5	20	2.0%
3	Victoria	7	5	6	18	1.8%
4	Houston	89	26	25	140	14.0%
5	Beaumont	5	5	2	12	1.2%
6	Huntsville	16	11	7	34	3.4%
7	Kilgore	24	7	14	45	4.5%
8	Mt. Pleasant	12	7	9	28	2.8%
9	Wichita Falls	5	5	4	14	1.4%
10	Richardson	67	18	20	105	10.5%
11	Fort Worth	71	30	17	118	11.8%
12	Waco	27	19	12	58	5.8%
13	Austin	62	16	11	89	8.9%
14	Abilene	13	3	8	24	2.4%
15	San Angelo	14	8	6	28	2.8%
16	Amarillo	21	7	13	41	4.1%
17	Lubbock	20	6	9	35	3.5%
18	Midland	16	3	7	26	2.6%
19	El Paso	13	6	8	27	2.7%
20	San Antonio	66	16	14	96	9.6%
	SUM	587	210	204	1008	100.0%
	AVERAGE	58.6%	21.0%	20.4%	100.0%	